

KINDS AND SOURCES OF POLLUTION PROBLEMS NORTHWEST REGION

		KIND OF PROBLEM								
SOURCE OF PROBLEM		Oxygen dfcy.	Turbidity	Sediments	Enrichment	Bacteria	Toxics	pH	Heat	TDS
MUNICIPAL	Municipal Wastes	XXXX			XXXX					
	Urban runoff									
MANUFACTURING	Primary metal		XXXX	XXXX						
	Canning & Frzg.		XXXX	XXXX	XXXX					
	Steam power								XXXX	
	Pulp & Paper		XXXX				XXXX	XXXX		
	Lumber		XXXX	XXXX	XXXX		XXXX			
	Trspn. Eqpt.						XXXX	XXXX	XXXX	
	Chemicals							XXXX		
AGRICULTURE	Irrigation				XXXX		XXXX			
	Farm Animals		XXXX		XXXX					
	Cropland erosion				XXXX					
	Pesticides						XXXX			
	Logging		XXXX	XXXX						
MINING	Heavy Metals									
	Acid									
	Solids									
OTHER	Spills & Vessels	XXXX				XXXX				
	Natural Drainage									
	Reservoir Mngt.									
	Dredging									

= heavy impairment: extended both in time and in area of effect

= moderate impairment: limited in either time or area of effect

= light impairment: limited both in time and in area, contributory to some larger source of problem, or the source of a potential problem

= no control

Note: Table reproduced from DOI 1968 (Table 4).

Figure 4.3-1
 Portland Harbor RI/FS
 Remedial Investigation Report
 Sources of Pollution Problems in the Northwest Region in 1968

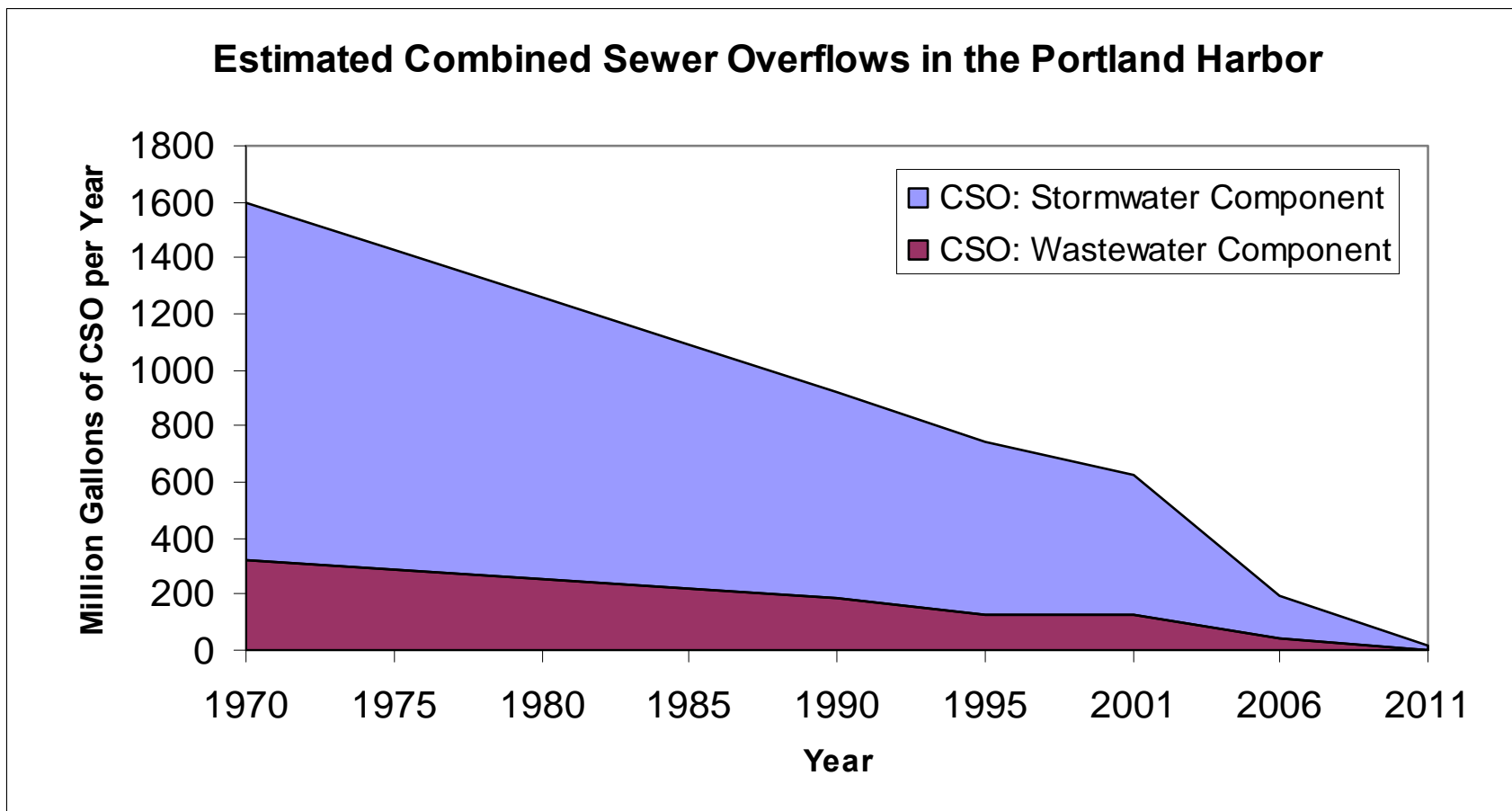
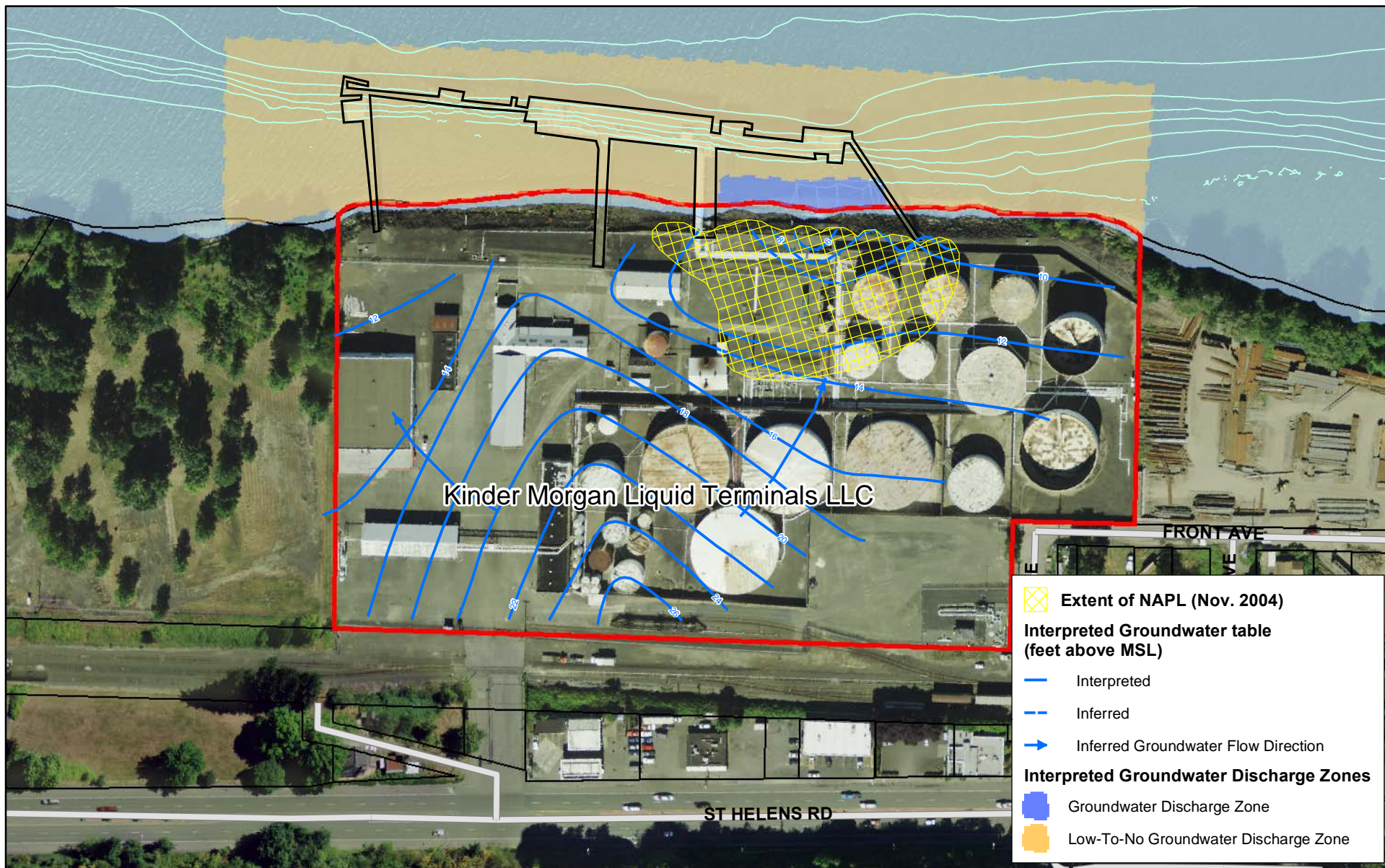


Figure 4.4-1
Portland Harbor RI/FS
Remedial Investigation Report
Estimated Combined Sewer Overflows
in the Portland Harbor

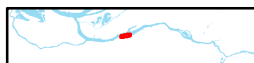


LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

0 50 100
Feet



FEATURE SOURCES:
Aerial Photo: Metro RLIS, 2007.
Base Map Features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Groundwater Well Data: locations are approximate and drawn from Delta, 2005a.
Groundwater Monitoring/Project Status Update Report, Third Quarter 2004.
Kinder Morgan Liquid Terminals, LLC, Linnton Terminal, Portland, Oregon. January 11, 2005.

Figure 4.4-2a
Portland Harbor RI/FS
Remedial Investigation Report
Kinder Morgan Linnton Site
Distribution of NAPL in Upland Groundwater

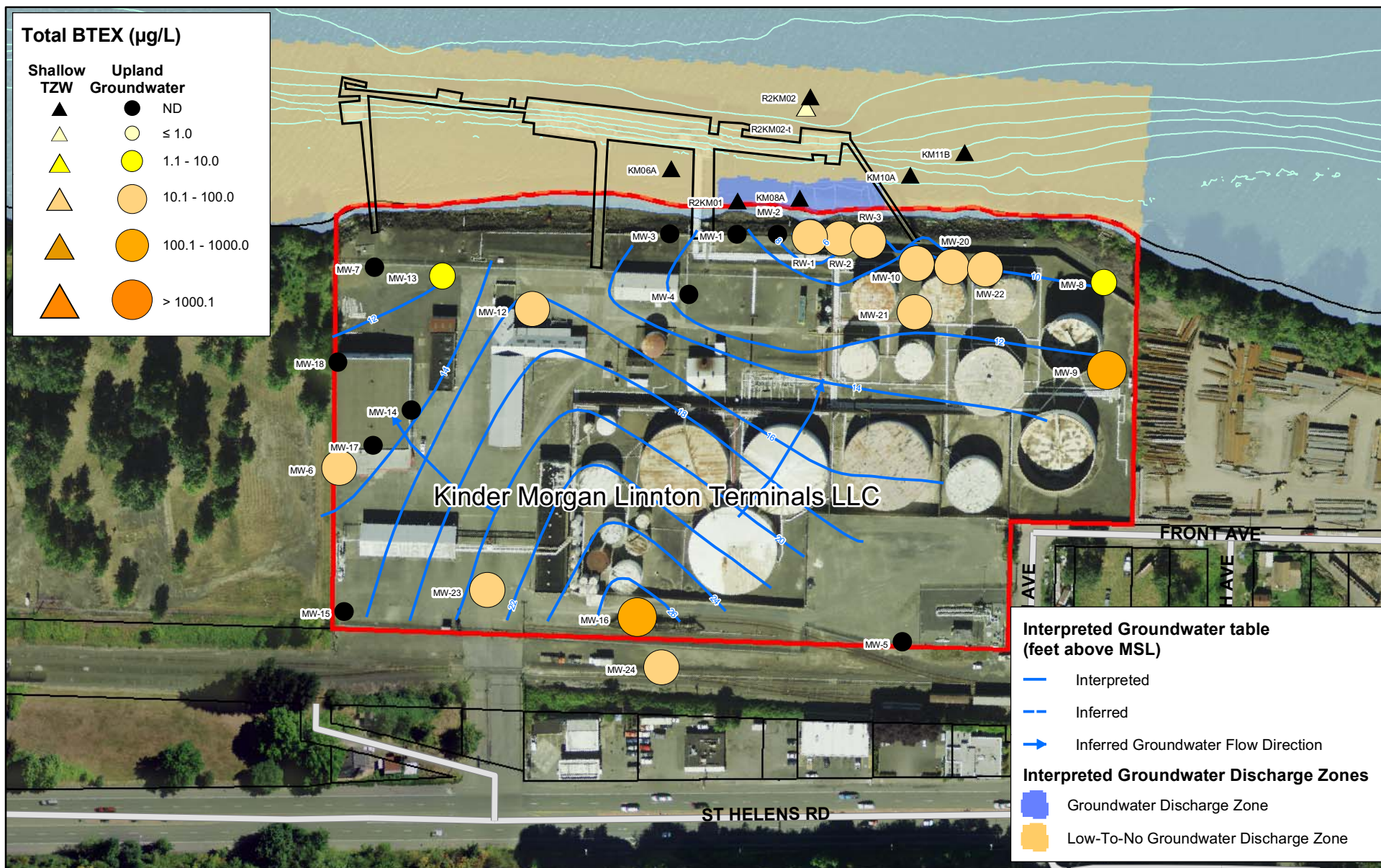


Figure 4.4-2b
 Portland Harbor RI/FS
 Remedial Investigation Report
 Kinder Morgan Linnton Site
 Total BTEX in Upland Groundwater
 and Shallow TZW

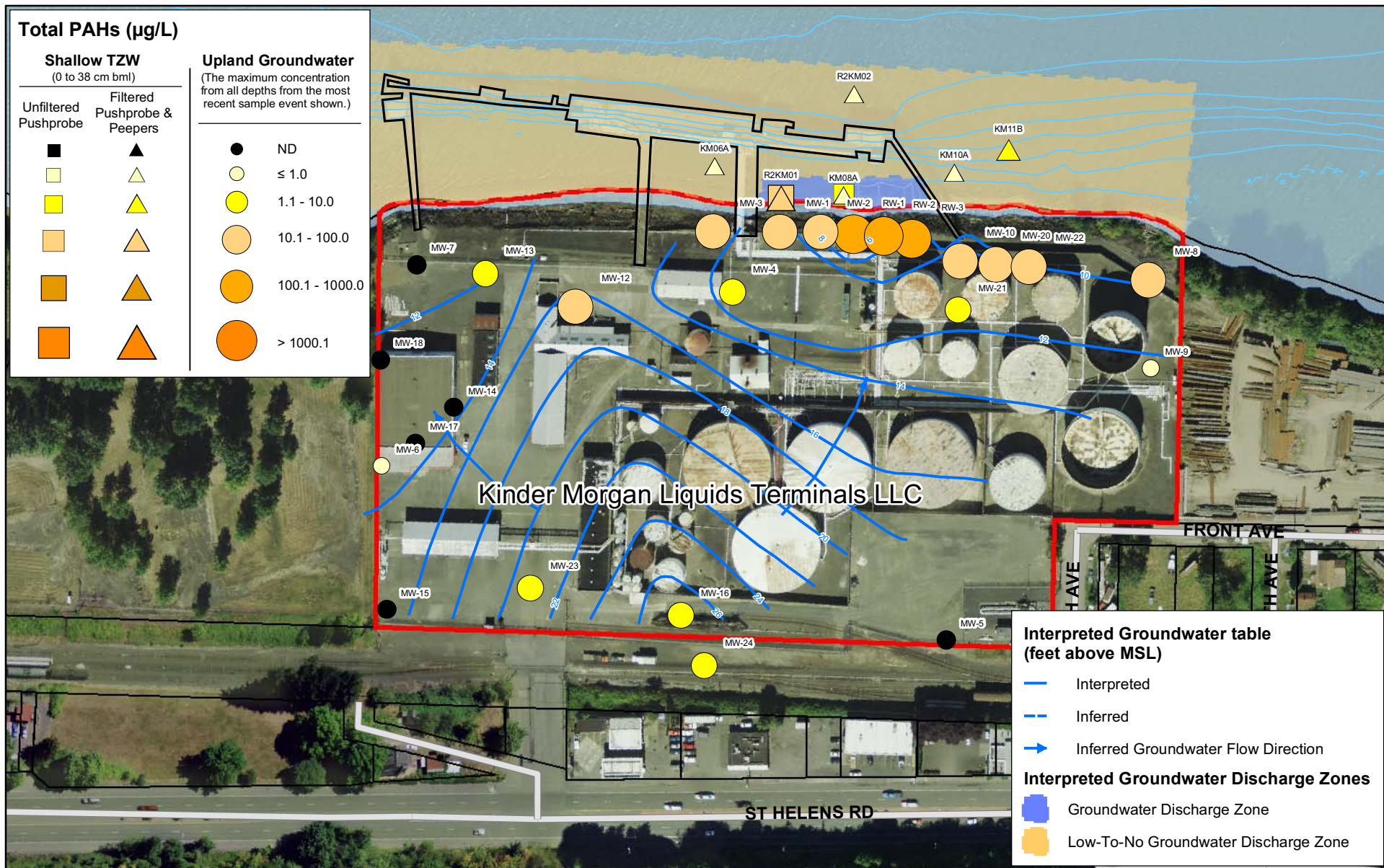


Figure 4.4-2c
 Portland Harbor RI/FS
 Remedial Investigation Report
 Kinder Morgan Linnton Site
 Total PAHs in Upland Groundwater
 and Shallow TZW

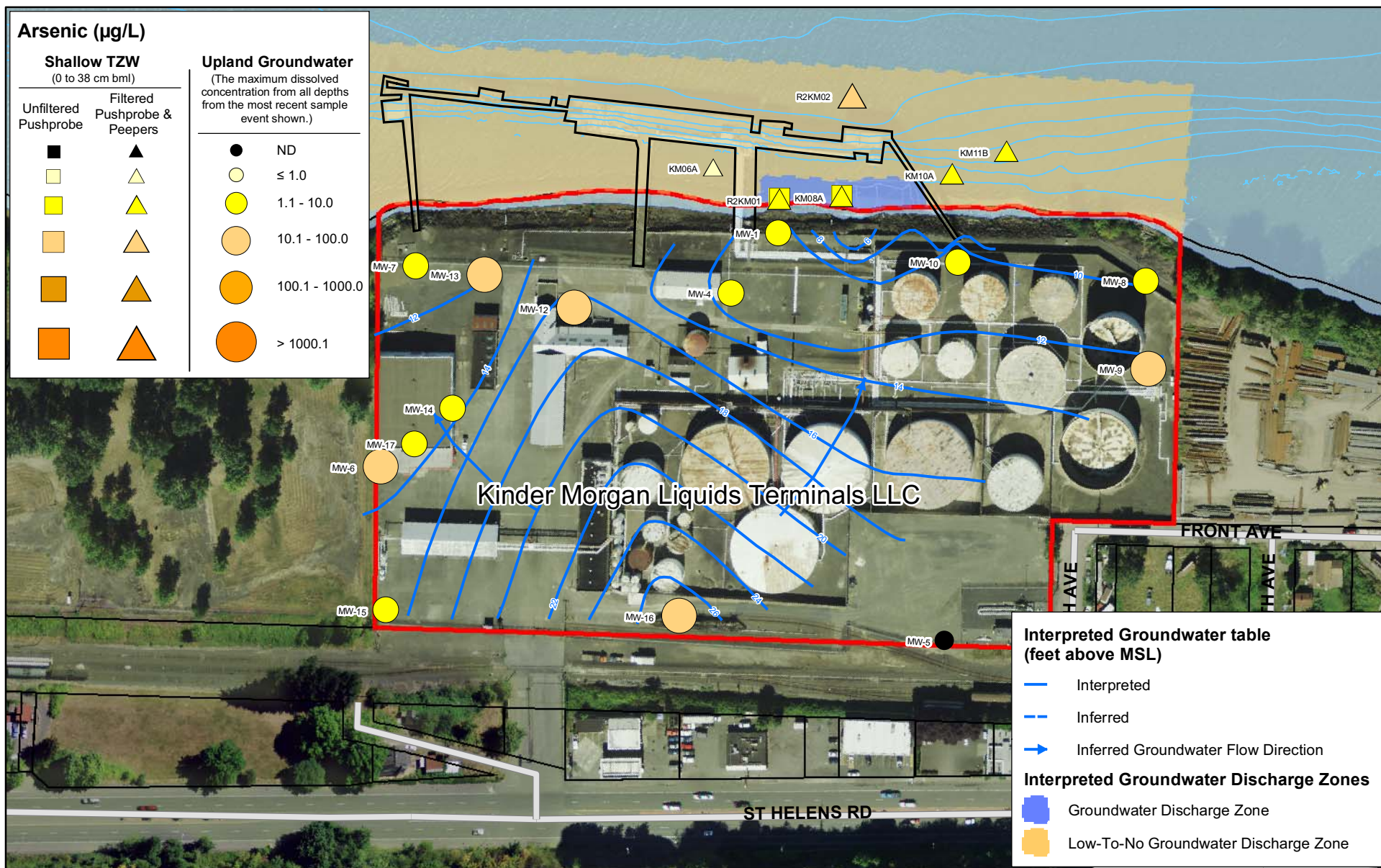
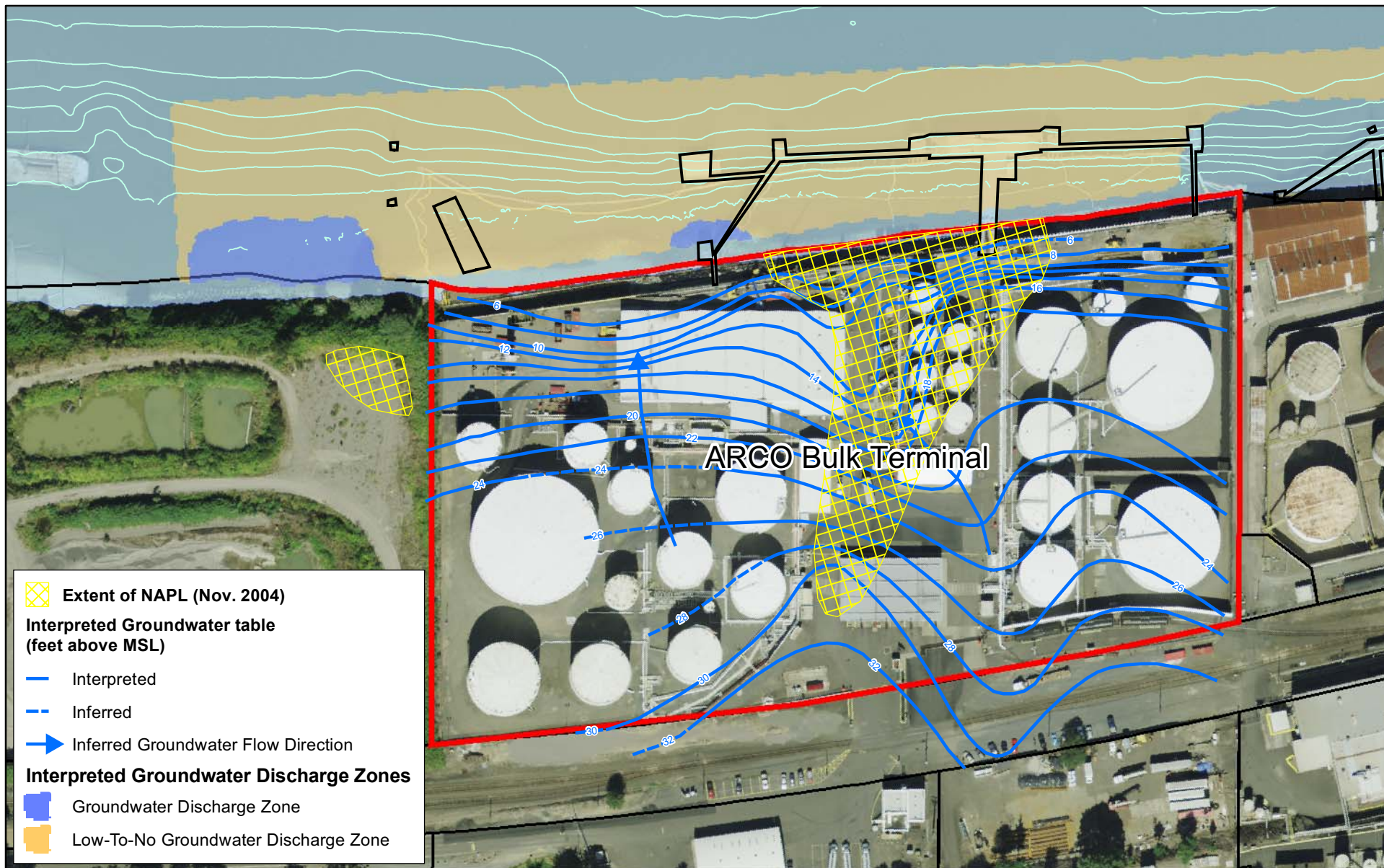
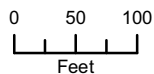


Figure 4.4-2d
 Portland Harbor RI/FS
 Remedial Investigation Report
 Kinder Morgan Linnton Site
 Arsenic in Upland Groundwater
 and Shallow TZW



LEGEND

- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary

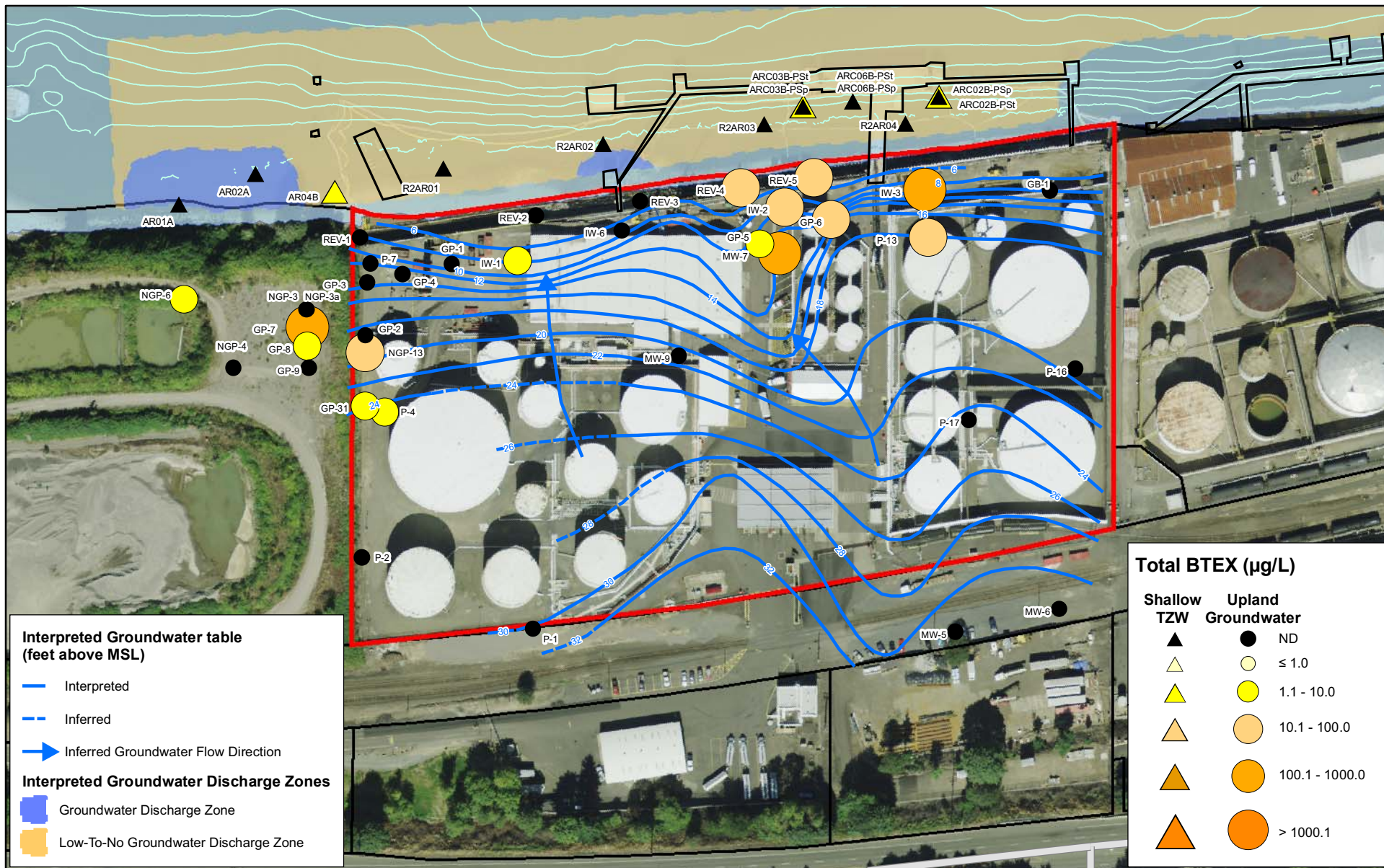


FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
 Base Map features from Portland Metro's RLIS.
 Channel and River Miles: Developed from US Army Corps of Engineers information.
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 Cross-Sections: Locations are approximate and drawn by measuring from Figure 2-2 (SECOR 2004).
 Wells & Remediation Systems: Remediation System Outline (ft) is approximate; traced from original figures created by URS (May 27, 2004 & March 2004).
 Groundwater Contours: Interpreted Groundwater Table Contours (ft) are approximate; traced from original figures created by URS (May 27, 2004 & March 2004).



Figure 4.4-3a
 Portland Harbor RI/FS
 Remedial Investigation Report
 ARCO Site
 Distribution of NAPL in Upland Groundwater



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

0 50 100
Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
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Figure 4.4-3b
Portland Harbor RI/FS
Remedial Investigation Report
ARCO Site
Total BTEX in Upland Groundwater
and Shallow TZW

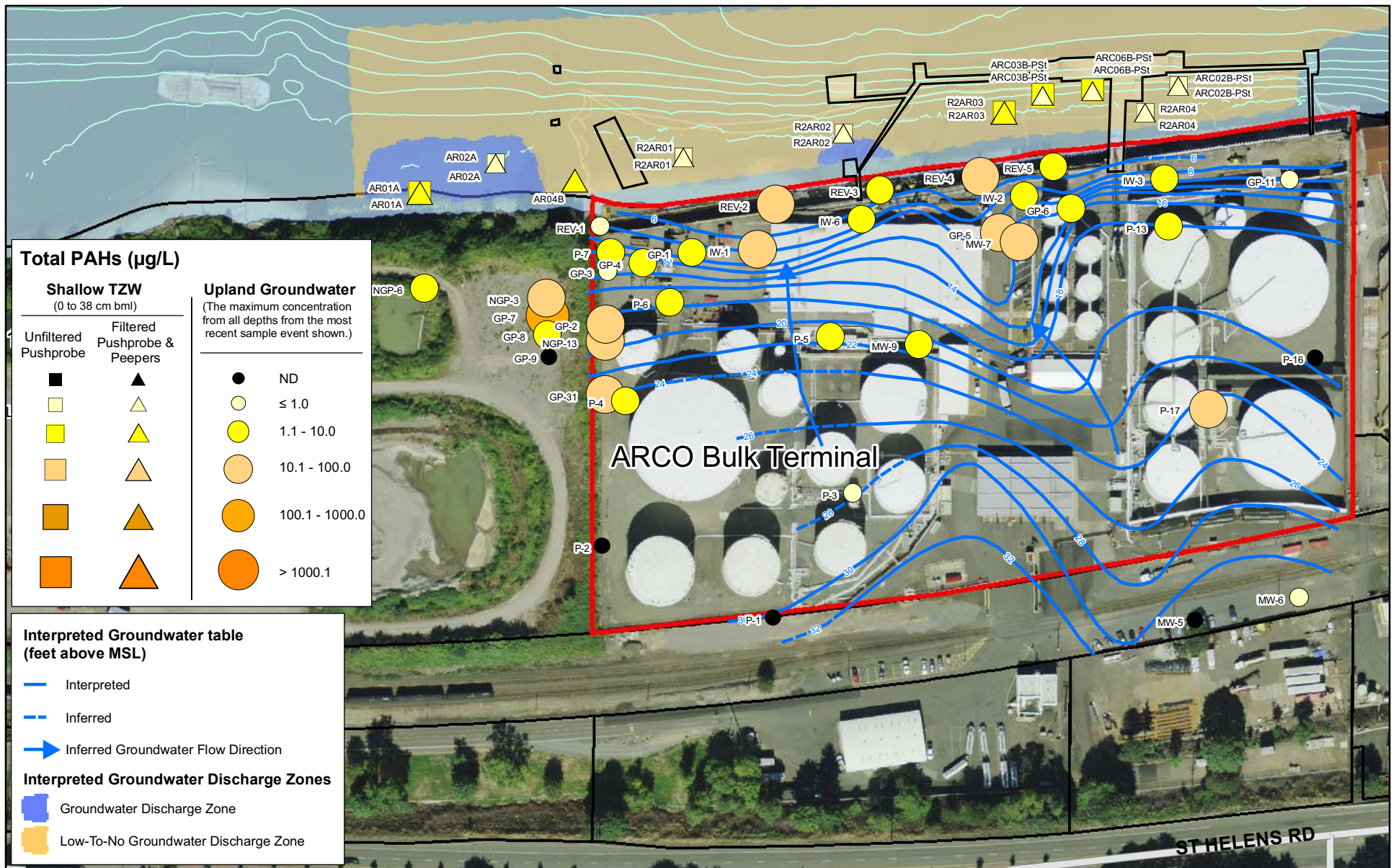
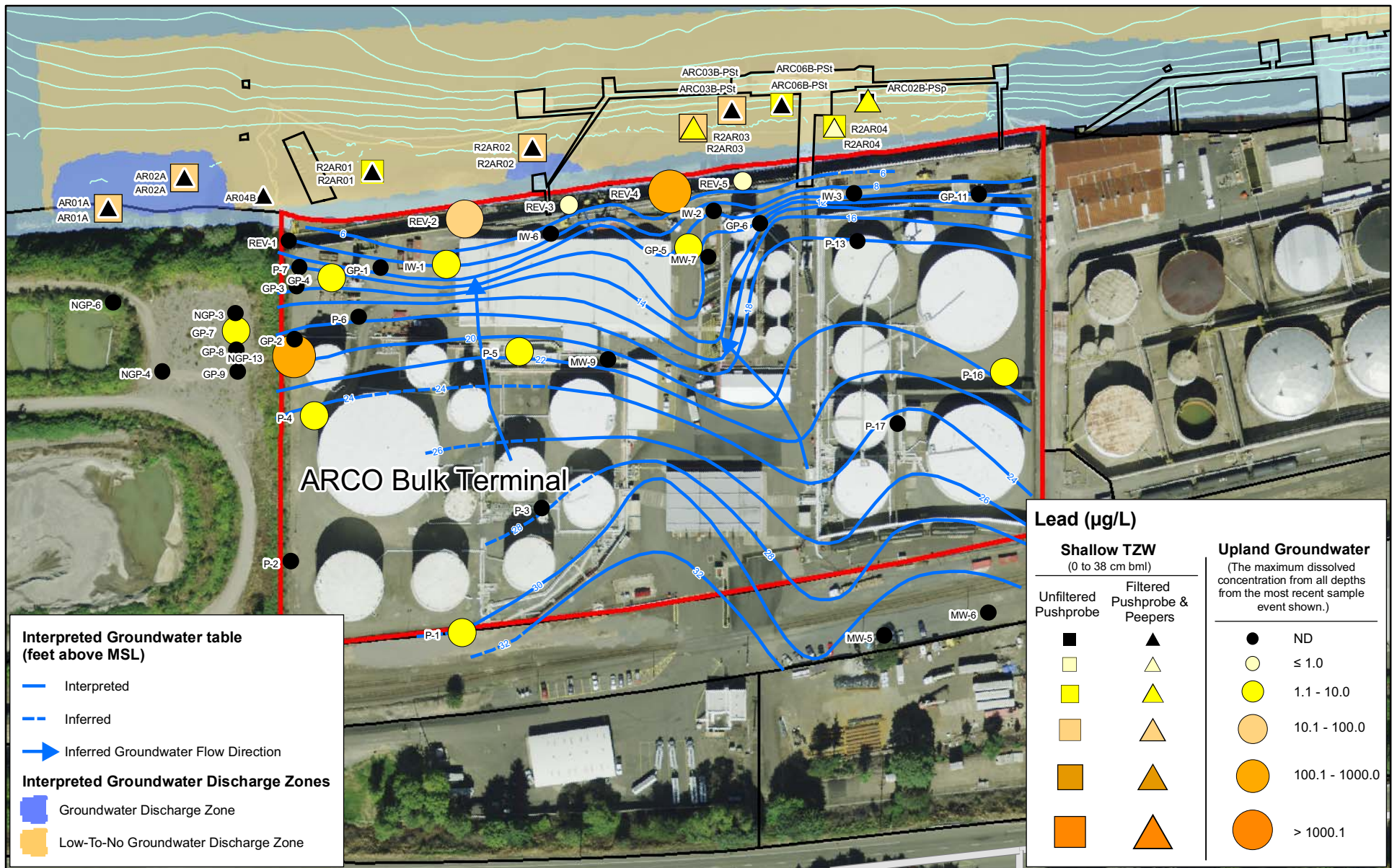


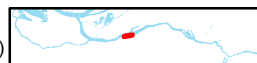
Figure 4.4-3c
 Portland Harbor RI/FS
 Remedial Investigation Report
 ARCO Site
 Total PAHs in Upland Groundwater
 and Shallow TZW



LEGEND

- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary

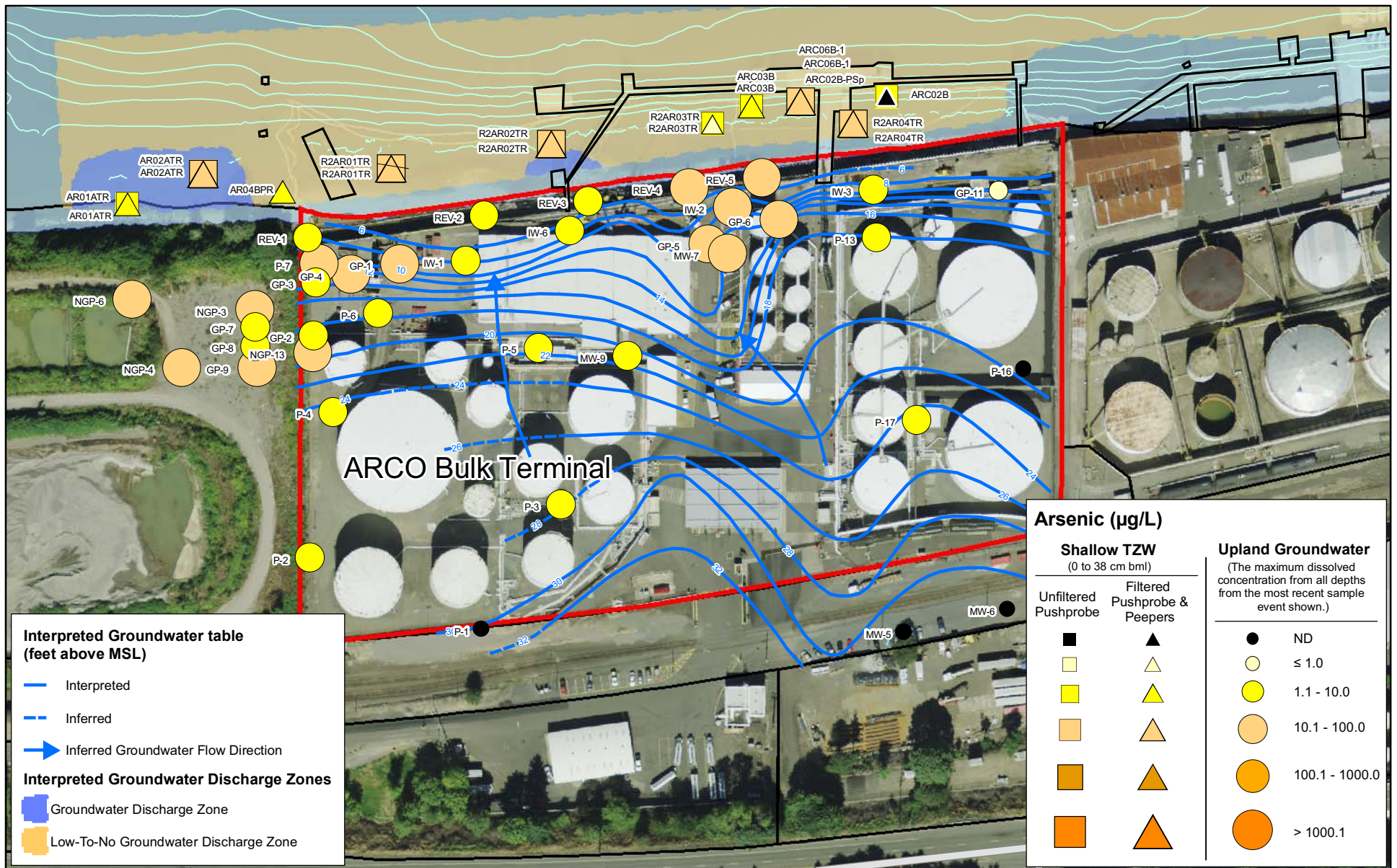
0 50 100
Feet



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Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
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Figure 4.4-3d
Portland Harbor RI/FS
Remedial Investigation Report
ARCO Site
Lead in Upland Groundwater
and Shallow TZW



LEGEND

- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary

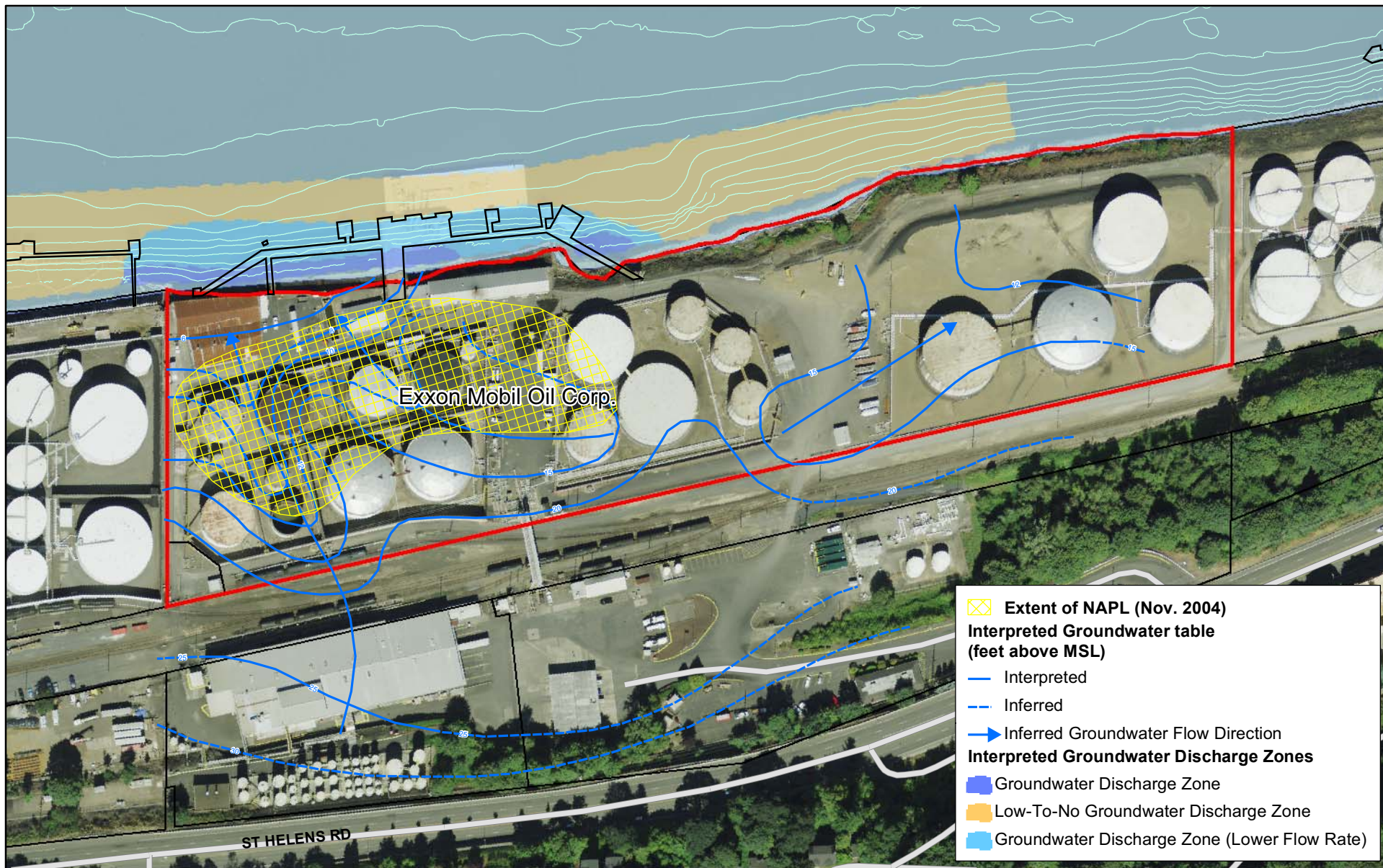
0 50 100
Feet



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Groundwater Contours: Interpreted Groundwater Table Contours (ft) are approximate; traced from original figures created by URS (May 27, 2004 & March 2004).

Figure 4.4-3e
Portland Harbor RI/FS
Remedial Investigation Report
ARCO Site
Arsenic in Upland Groundwater
and Shallow TZW



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

0 50 100
Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Groundwater Contour: locations are approximate and drawn by measuring from Figure 3 (Kleinfelder, Oct. 14, 2002).
Wells & Remediation System: locations are approximate and drawn by measuring from Figure 3 (Kleinfelder, Oct. 14, 2002).

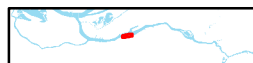


Figure 4.4-4a
Portland Harbor RI/FS
Remedial Investigation Report
ExxonMobil Site
Distribution of NAPL in Upland Groundwater and TZW

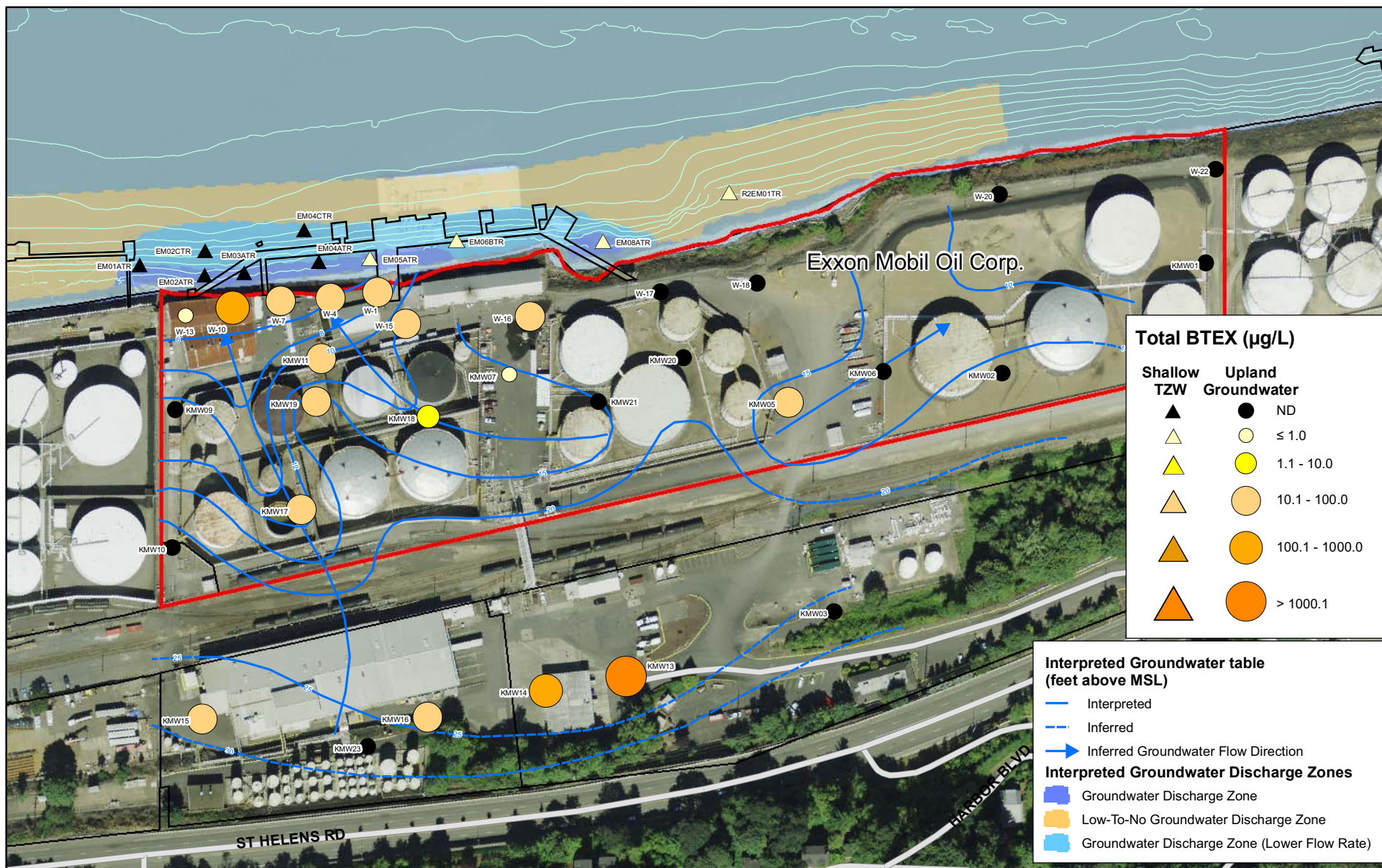


Figure 4.4-4b
 Portland Harbor RI/FS
 Remedial Investigation Report
 ExxonMobil Site
 Total BTEX in Upland Groundwater
 and Shallow TZW

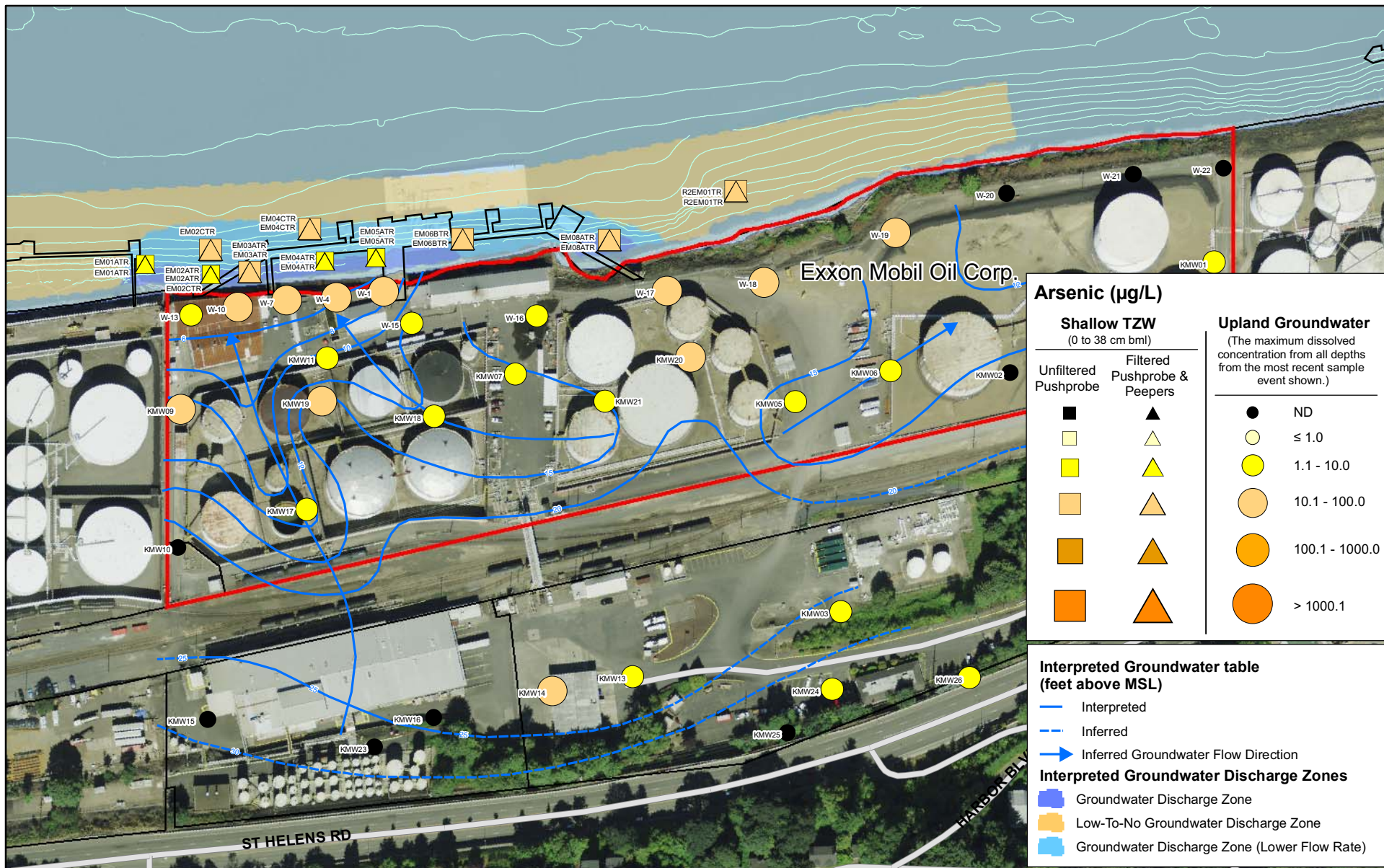
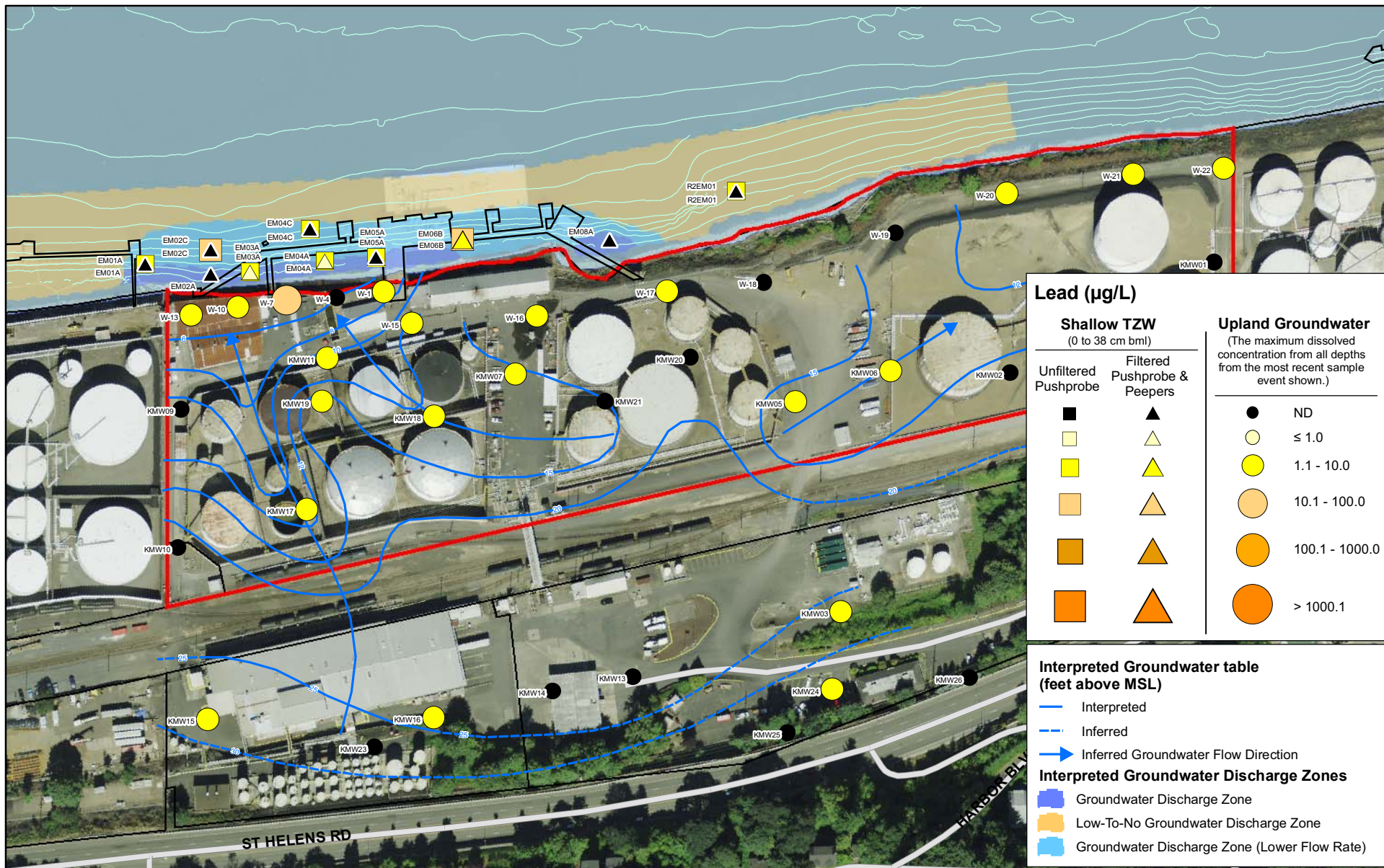
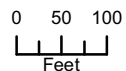


Figure 4.4-4c
 Portland Harbor RI/FS
 Remedial Investigation Report
 ExxonMobil Site
 Arsenic in Upland Groundwater
 and Shallow TZW



LEGEND

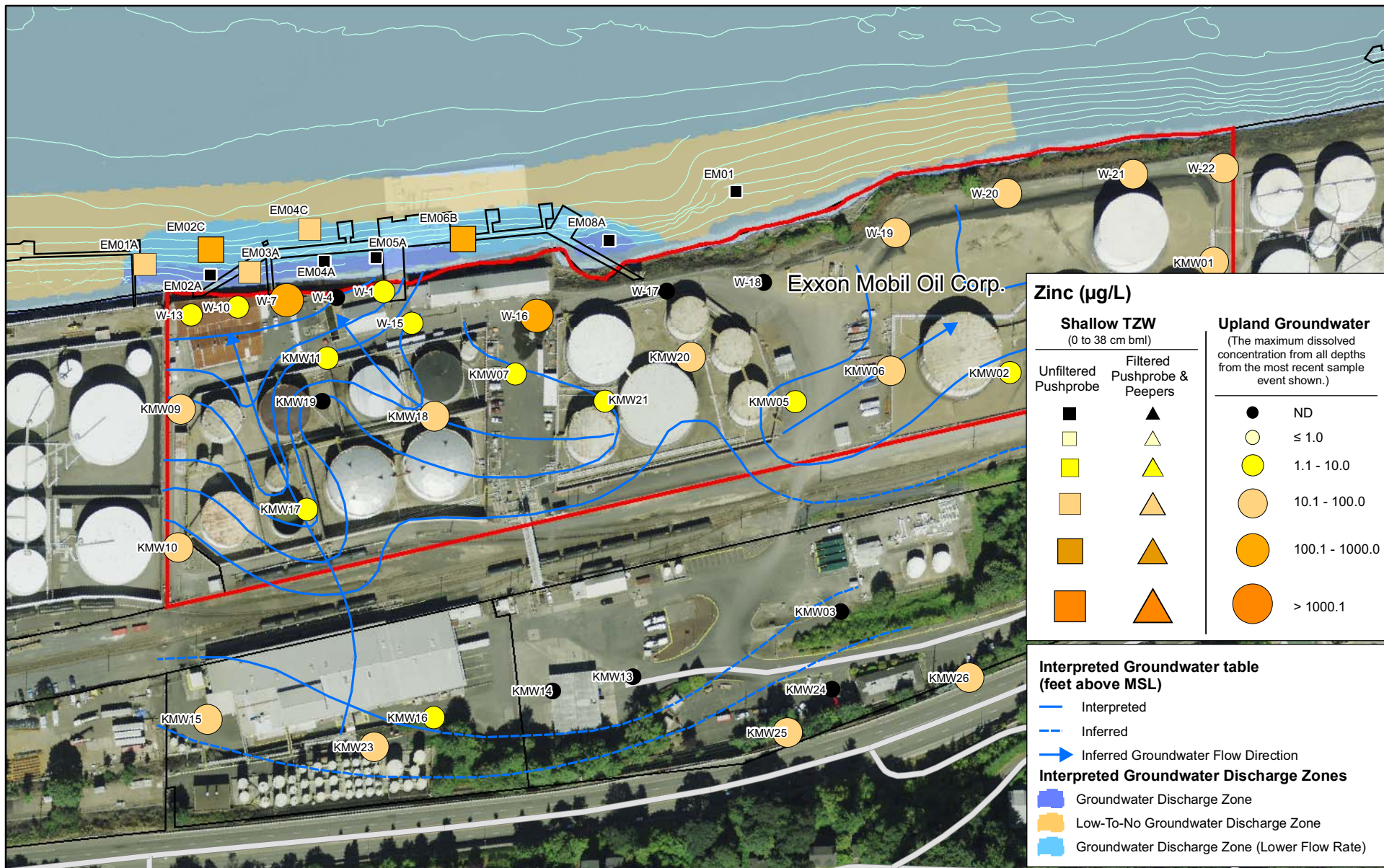
- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
 Base Map features from Portland Metro's RLIS.
 Channel and River Miles: Developed from US Army Corps of Engineers information.
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
 Groundwater Contour: locations are approximate and drawn by measuring from Figure 3 (Kleinfelder, Oct. 14, 2002).
 Wells & Remediation System: locations are approximate and drawn by measuring from Figure 3 (Kleinfelder, Oct. 14, 2002).

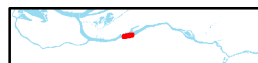
Figure 4.4-4d
 Portland Harbor RI/FS
 Remedial Investigation Report
 ExxonMobil Site
 Lead in Upland Groundwater
 and Shallow TZW



LEGEND

- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary

0 50 100
Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Groundwater Contour: locations are approximate and drawn by measuring from Figure 3 (Kleinfelder, Oct. 14, 2002).
Wells & Remediation System: locations are approximate and drawn by measuring from Figure 3 (Kleinfelder, Oct. 14, 2002).

Figure 4.4-4e
Portland Harbor RI/FS
Remedial Investigation Report
ExxonMobil Site
Zinc in Upland Groundwater
and Shallow TZW

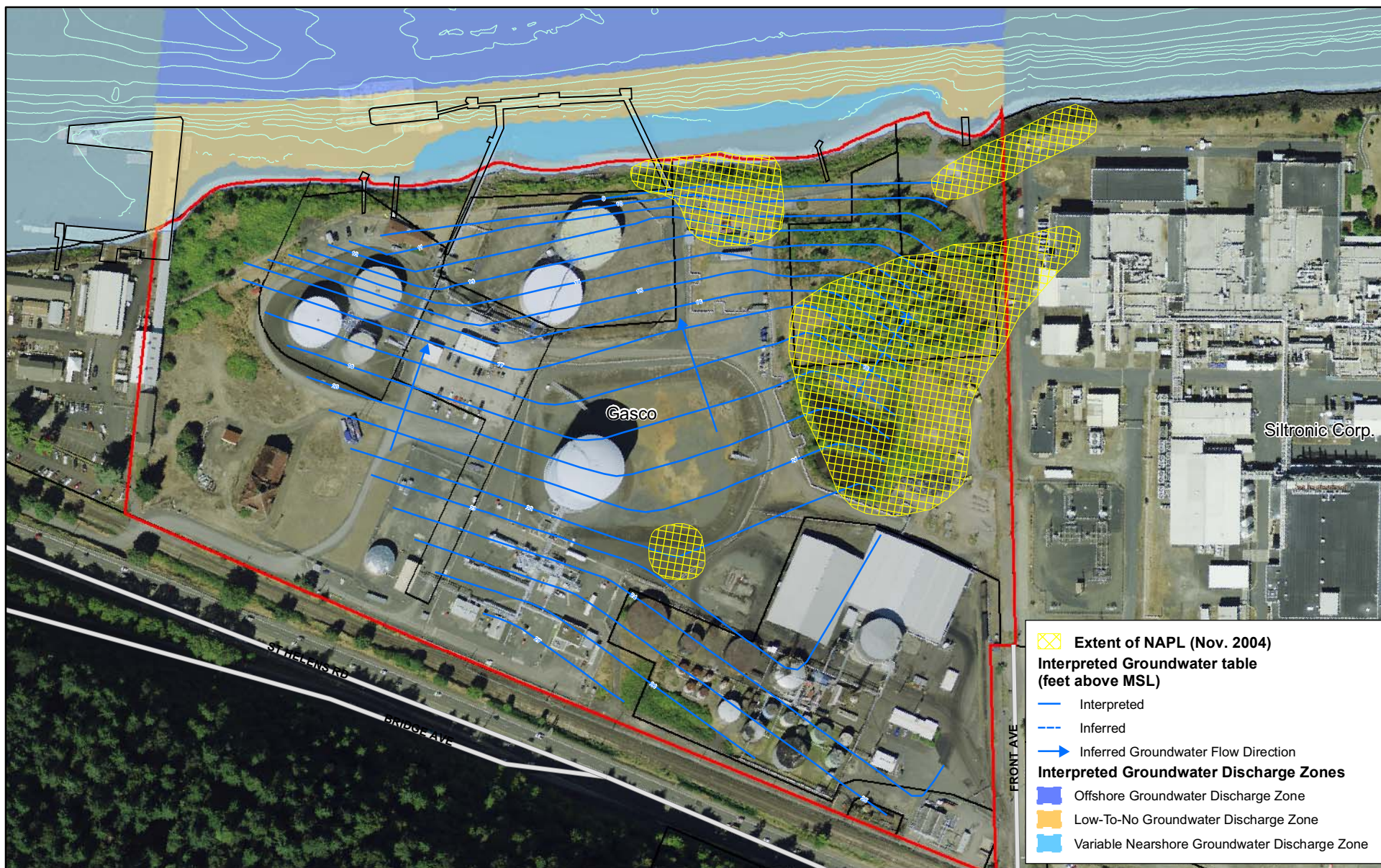


Figure 4.4-5a
 Portland Harbor RI/FS
 Remedial Investigation Report
 Gasco Site
 Distribution of NAPL in Upland Groundwater

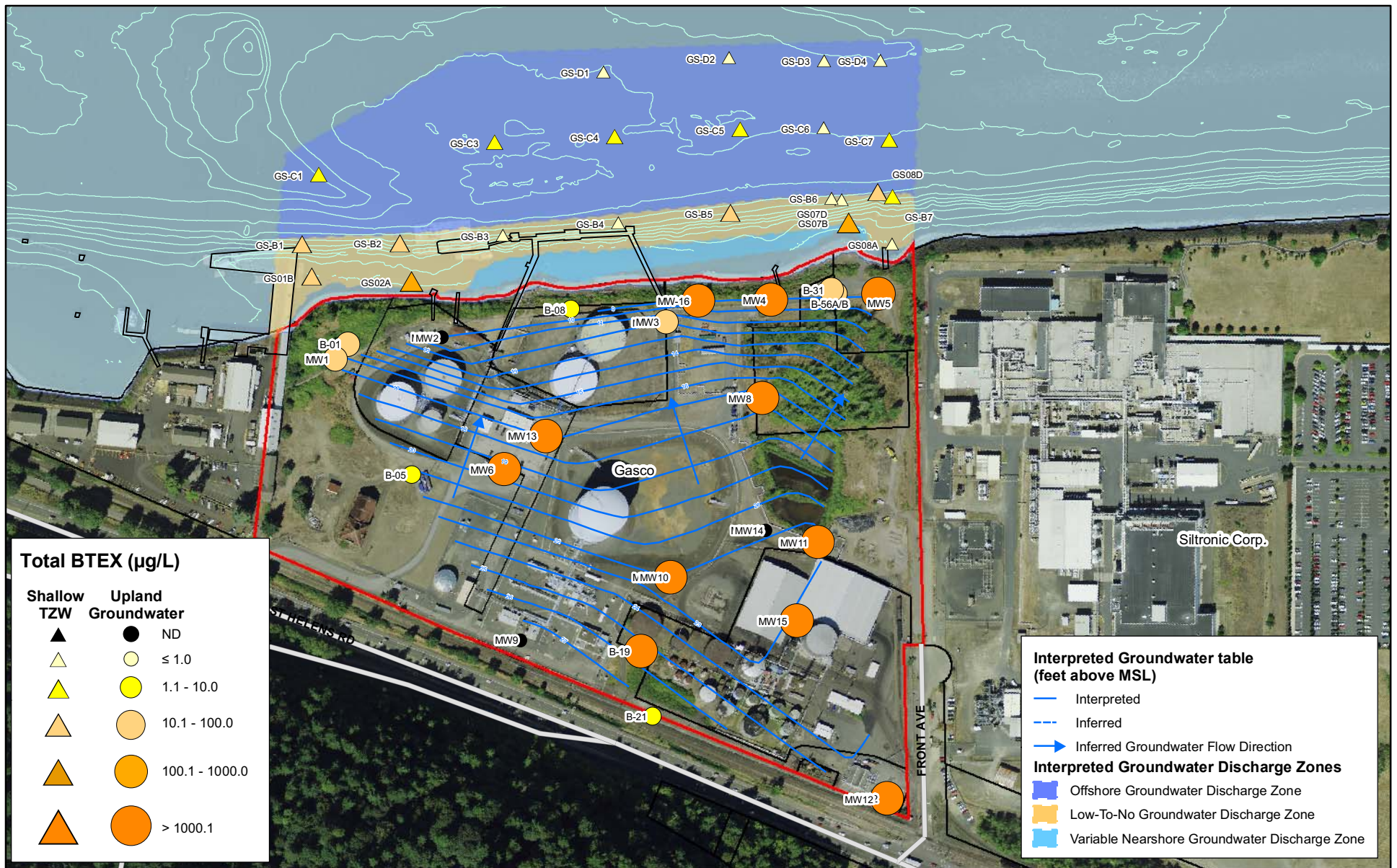
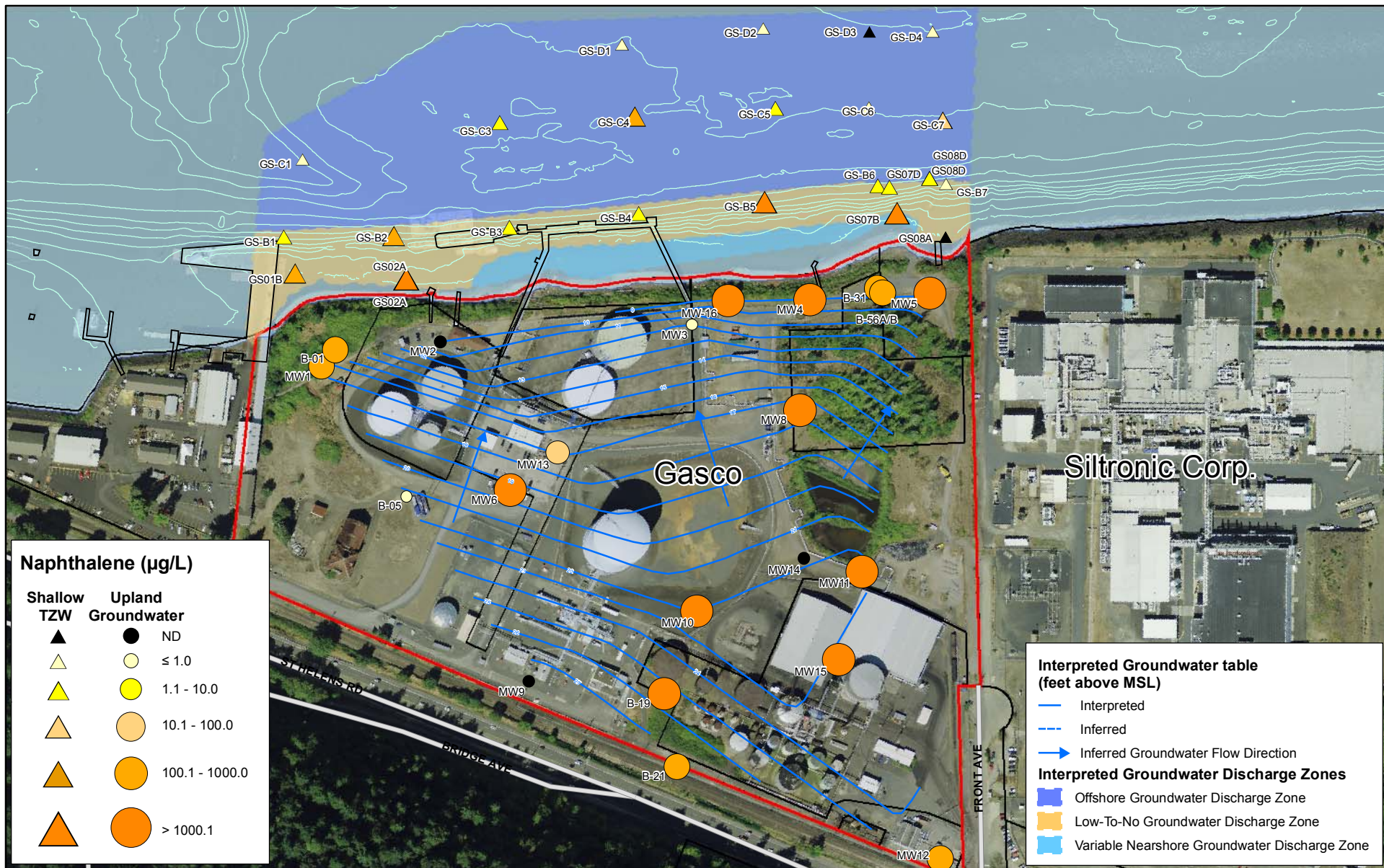


Figure 4.4-5b
 Portland Harbor RI/FS
 Remedial Investigation Report
 Gasco Site
 Total BTEX in Upland Groundwater
 and Shallow TZW



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)
 Site Property Boundary

0 50 100
 Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
 Base Map features from Portland Metro's RLIS.
 Channel and River Miles: Developed from US Army Corps of Engineers information.
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
 Wells, Groundwater Contours and Remediation Systems: Locations are approximate and drawn from IHA (2005). Report on Supplemental Upland Remedial Investigation Activities, 7900 NW St. Helens Road, Portland, Oregon. Hahn and Associates, Inc., March 11, 2005.

Figure 4.4-5c
 Portland Harbor RI/FS
 Remedial Investigation Report
 Gasco Site
 Naphthalene in Upland Groundwater
 and Shallow TZW

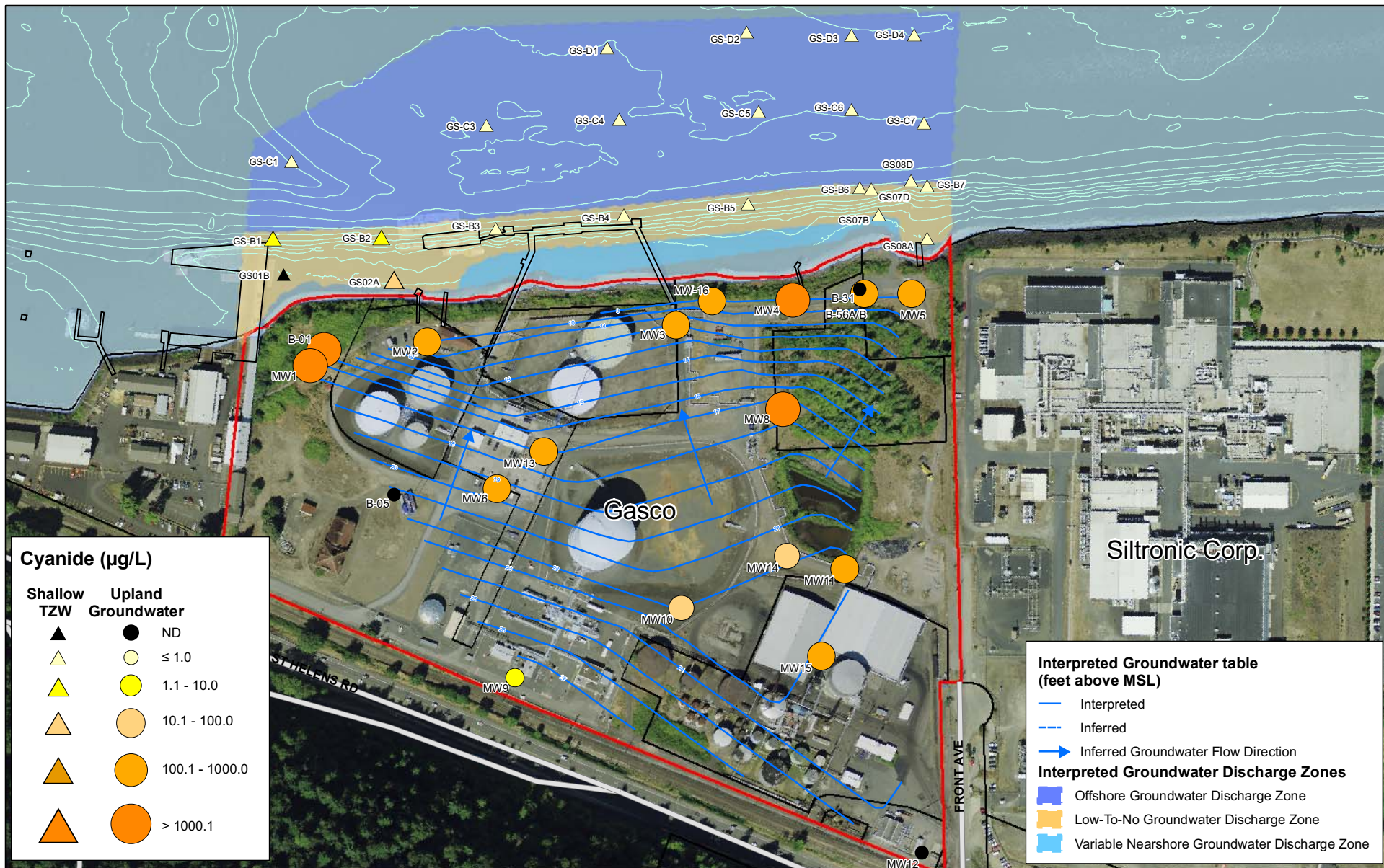
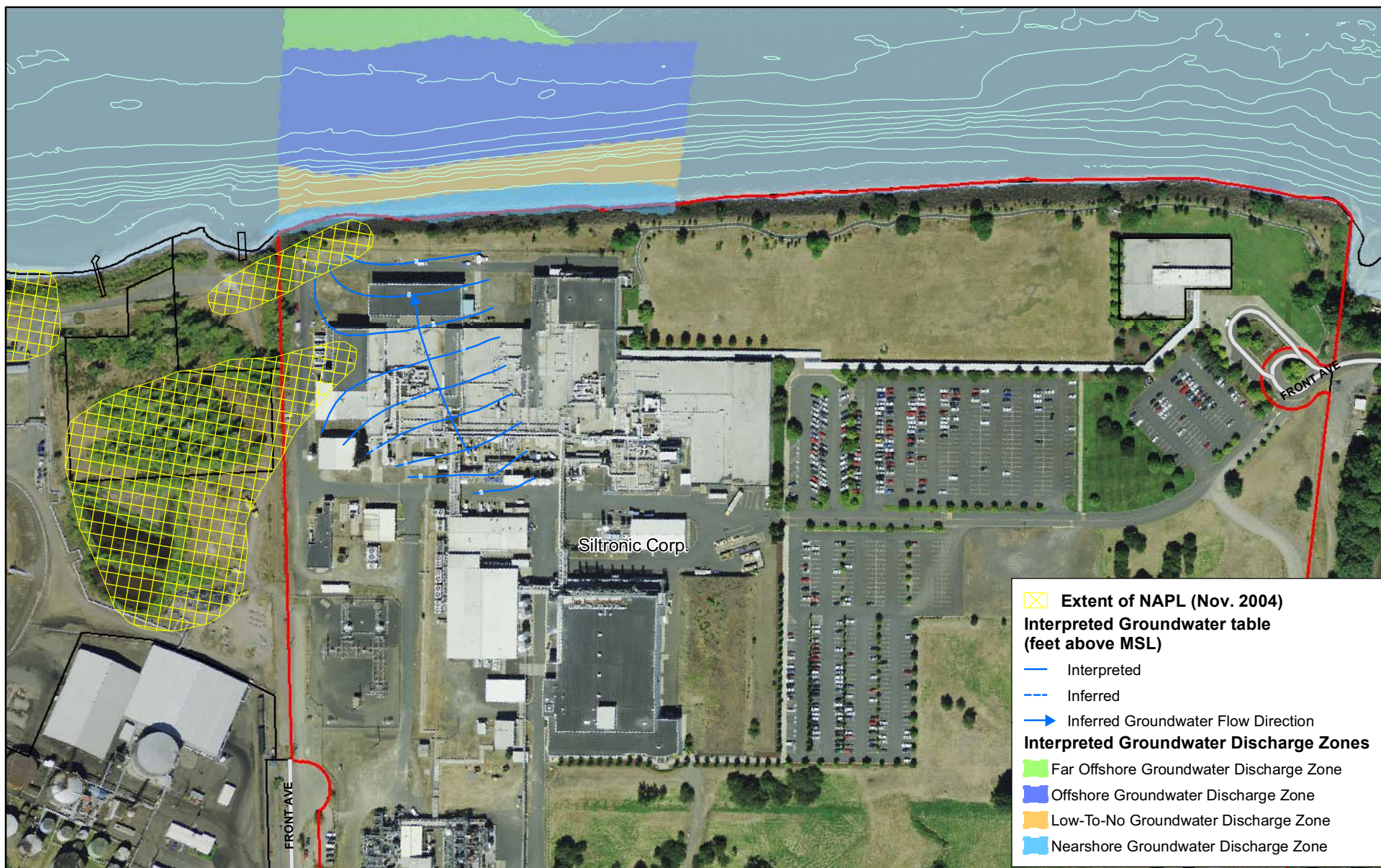


Figure 4.4-5d
 Portland Harbor RI/FS
 Remedial Investigation Report
 Gasco Site
 Total Cyanide in Upland Groundwater
 and Shallow TZW



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

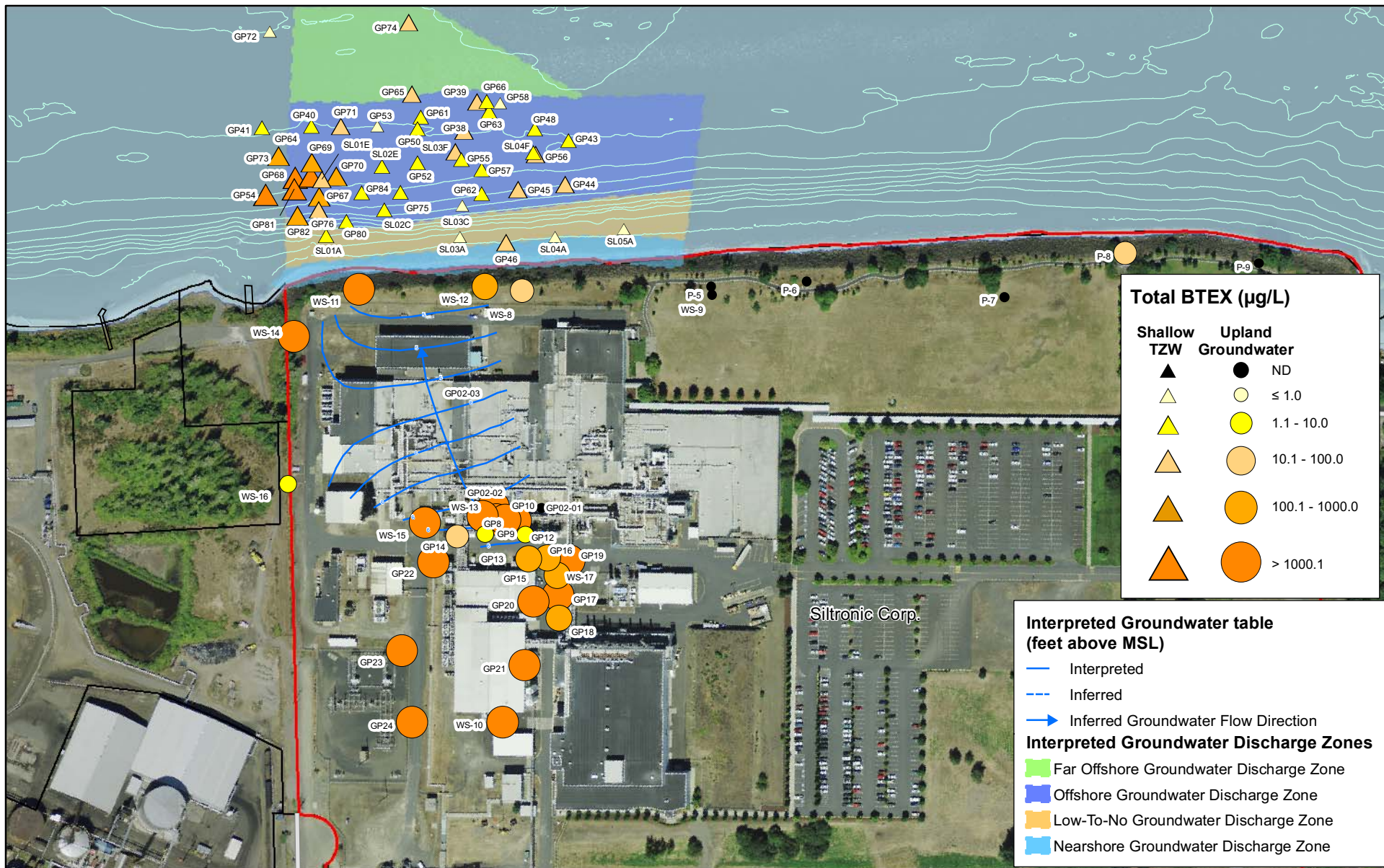
Site Property Boundary

0 100 200
Feet



FEATURE SOURCES:
 Aerial Photo: Metro RLIS, 2007.
 Base Map features from Portland Metro's RLIS.
 Channel and River Miles: Developed from US Army Corps of Engineers information.
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
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 Remedial Investigation Proposal, Siltronic Corporation Site, 7200 NW Front Avenue, Portland, Oregon 97210, Maul Foster & Alongi, Inc. April 2.

Figure 4.4-6a
 Portland Harbor RI/FS
 Remedial Investigation Report
 Siltronic Site
 Distribution of NAPL in Upland Groundwater

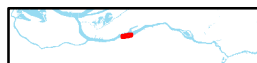


LEGEND

— 2003 Bathymetric 5 Ft. Contours (NAVD 88)

■ Site Property Boundary

0 100 200
Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.

Base Map features from Portland Metro's RLIS.

Channel and River Miles: Developed from US Army Corps of Engineers information.

Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.

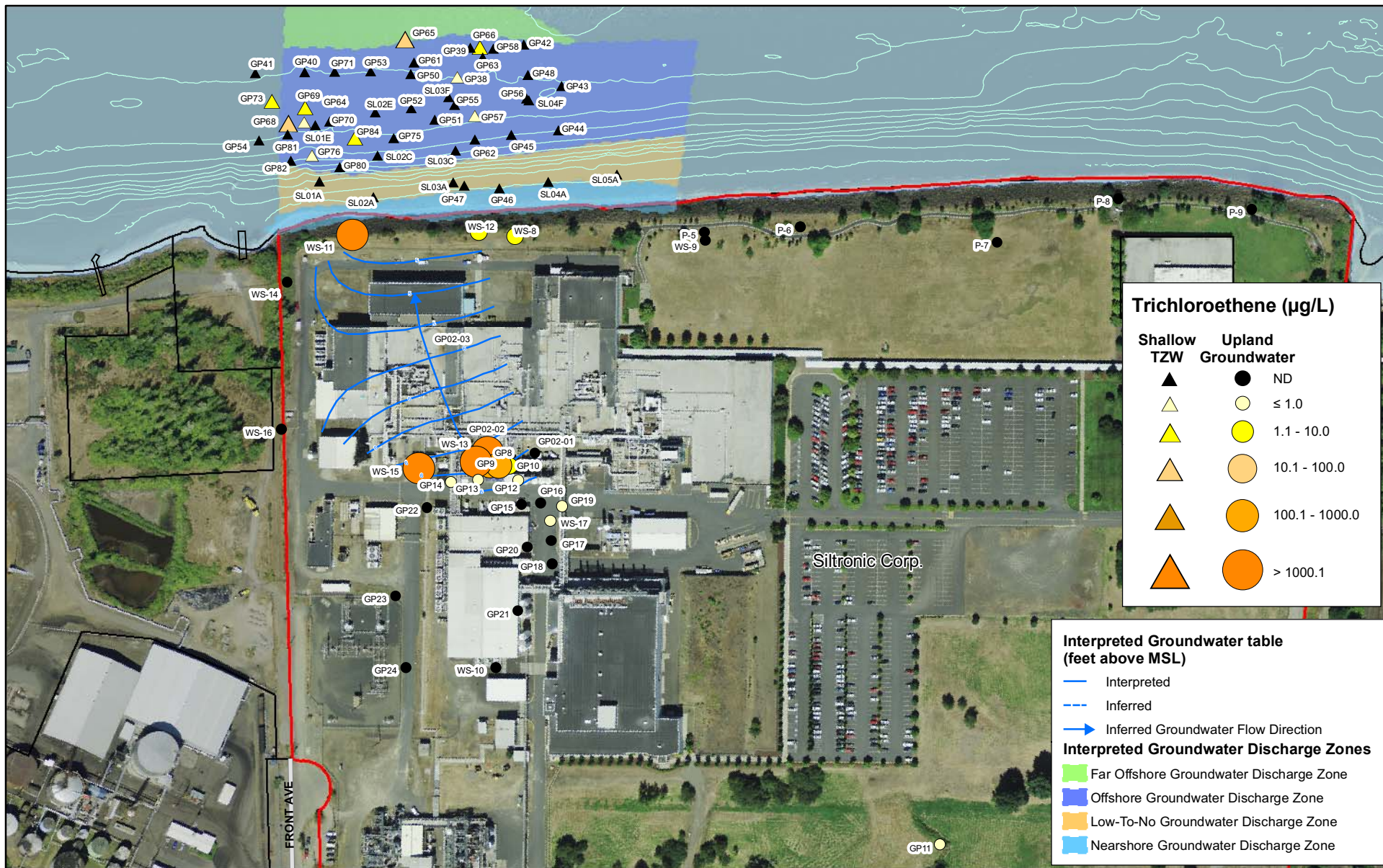
Wells & Groundwater Contours: Locations are approximate and drawn from MFA, 2004.

Remedial Investigation Proposal, Siltronic Corporation Site,

7200 NW Front Avenue, Portland, Oregon 97210,

Maul Foster & Alongi, Inc. April 2.

Figure 4.4-6b
Portland Harbor RI/FS
Remedial Investigation Report
Siltronic Site
Total BTEX in Upland Groundwater
and Shallow TZW



LEGEND

— 2003 Bathymetric 5 Ft. Contours (NAVD 88)

■ Site Property Boundary

0 100 200
Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Wells & Groundwater Contours: Locations are approximate and drawn from MFA, 2004. Remedial Investigation Proposal, Siltronic Corporation Site, 7200 NW Front Avenue, Portland, Oregon 97210, Maul Foster & Alongi, Inc. April 2.

Figure 4.4-6c
Portland Harbor RI/FS
Remedial Investigation Report
Siltronic Site
Trichloroethene in Upland Groundwater
and Shallow TZW

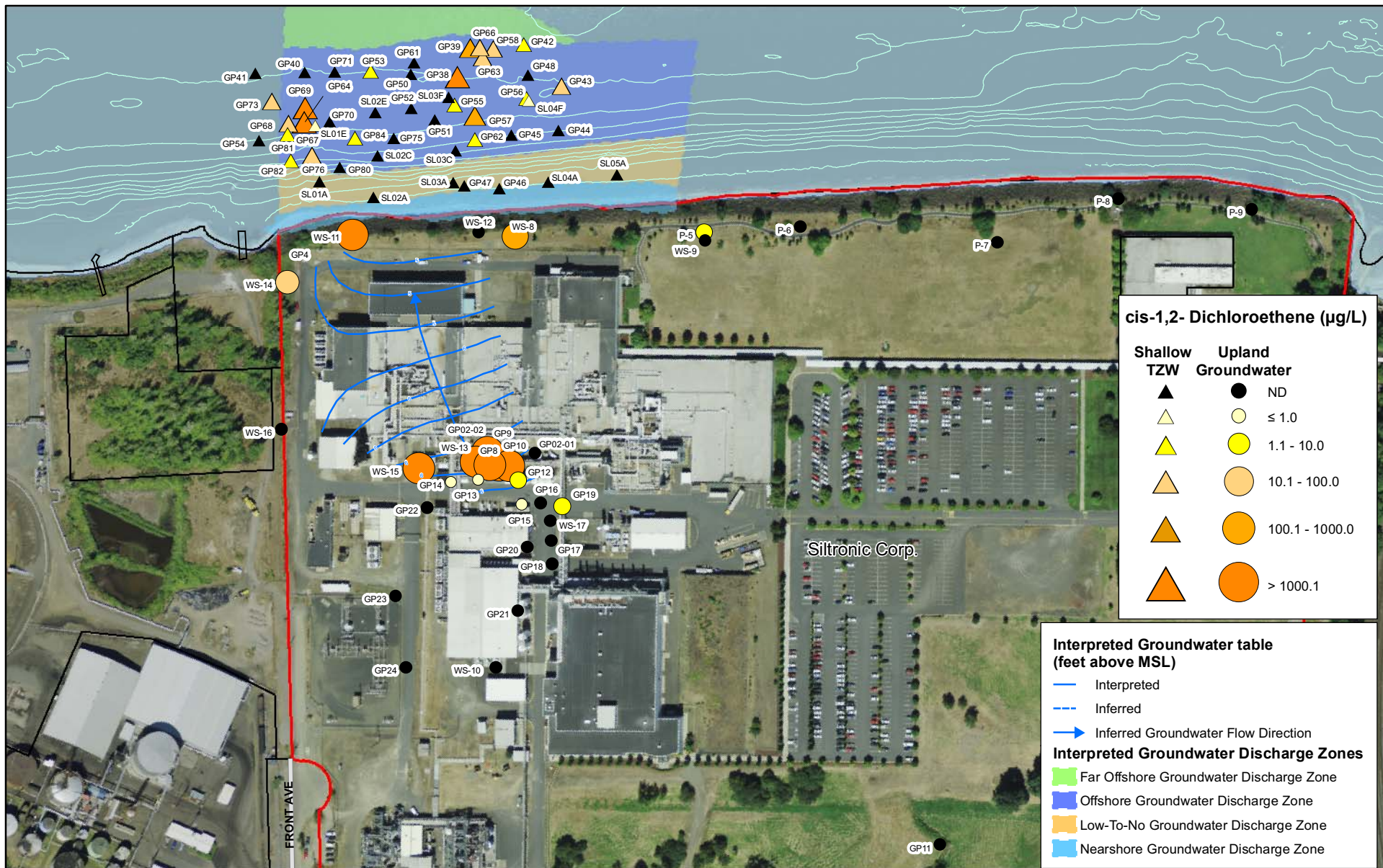
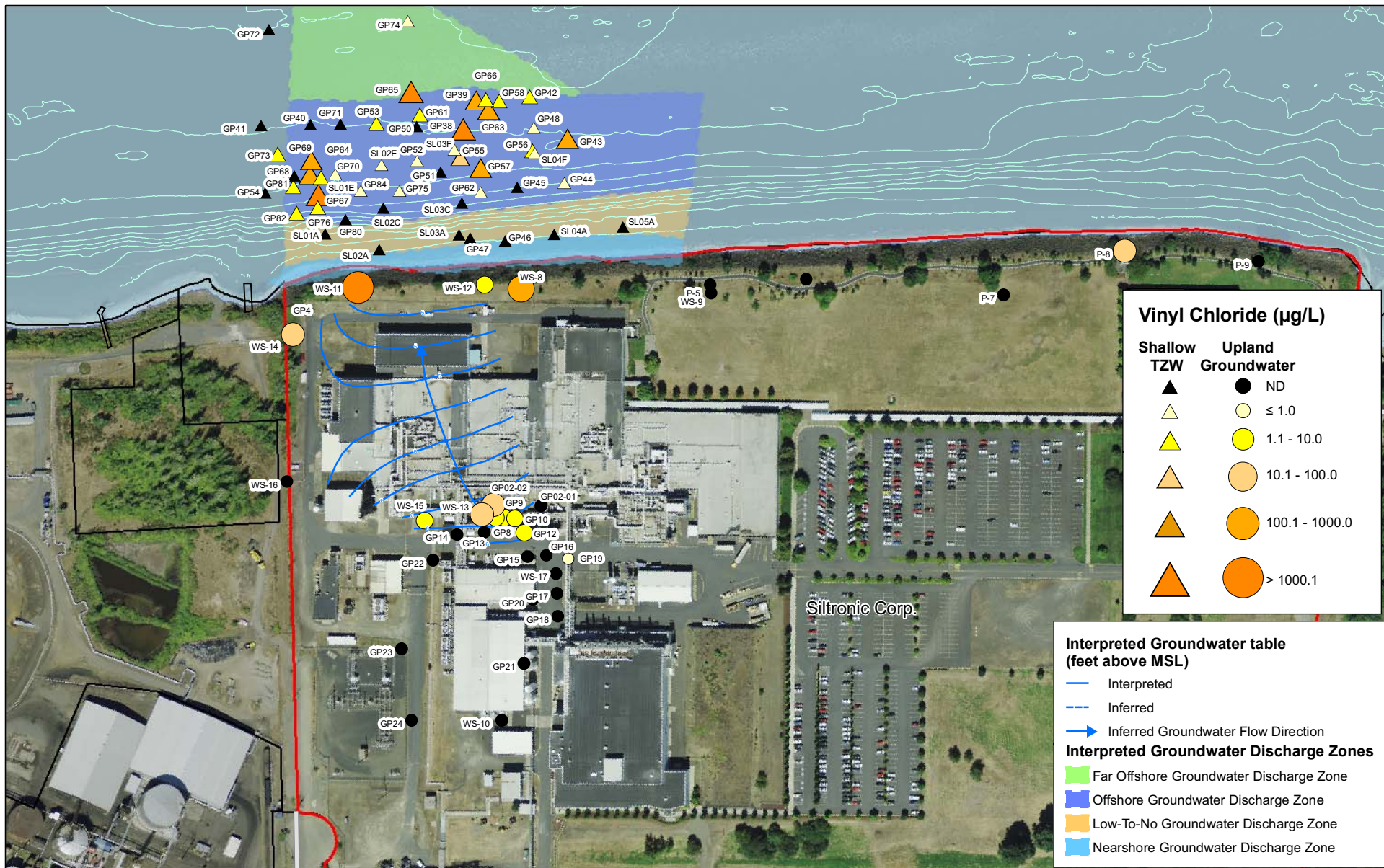


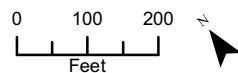
Figure 4.4-6d
 Portland Harbor RI/FS
 Remedial Investigation Report
 Siltronic Site
 cis-1,2-Dichloroethene in Upland Groundwater
 and Shallow TZW



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

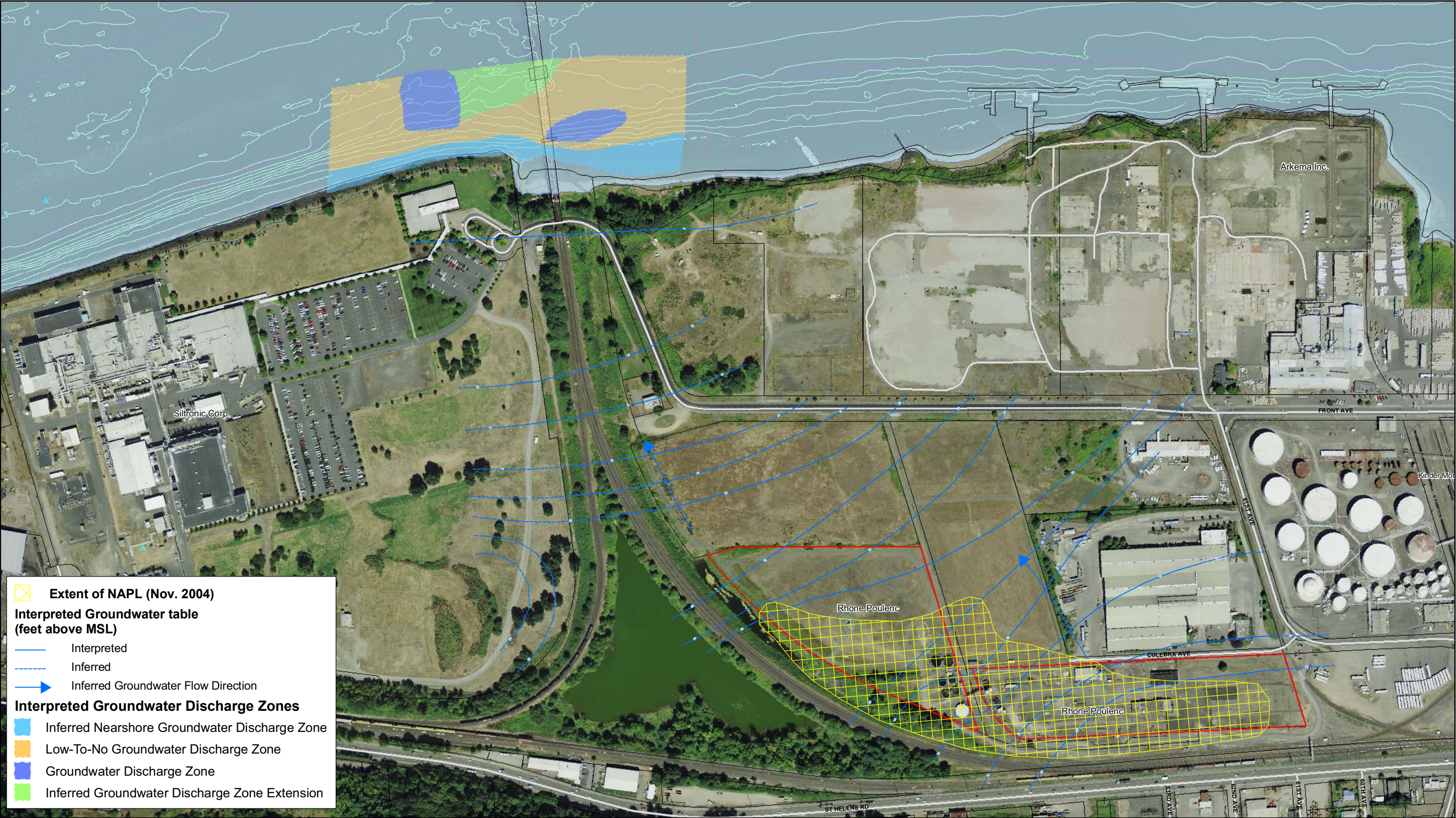
Site Property Boundary



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
 Base Map features from Portland Metro's RLIS.
 Channel and River Miles: Developed from US Army Corps of Engineers information.
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
 Wells & Groundwater Contours: Locations are approximate and drawn from MFA, 2004. Remedial Investigation Proposal, Siltronic Corporation Site, 7200 NW Front Avenue, Portland, Oregon 97210, Maul Foster & Alongi, Inc. April 2.

Figure 4.4-6e
 Portland Harbor RI/FS
 Remedial Investigation Report
 Siltronic Site
 Vinyl Chloride in Upland Groundwater
 and Shallow TZW



Extent of NAPL (Nov. 2004)

Interpreted Groundwater table
(feet above MSL)

Interpreted

Inferred

Inferred Groundwater Flow Direction

Interpreted Groundwater Discharge Zones

Inferred Nearshore Groundwater Discharge Zone

Low-To-No Groundwater Discharge Zone

Groundwater Discharge Zone

Inferred Groundwater Discharge Zone Extension

LEGEND

River Miles

2003 Bathymetric 5 Ft. Contours (NAVD88)

Navigation Channel

Site Property Boundary

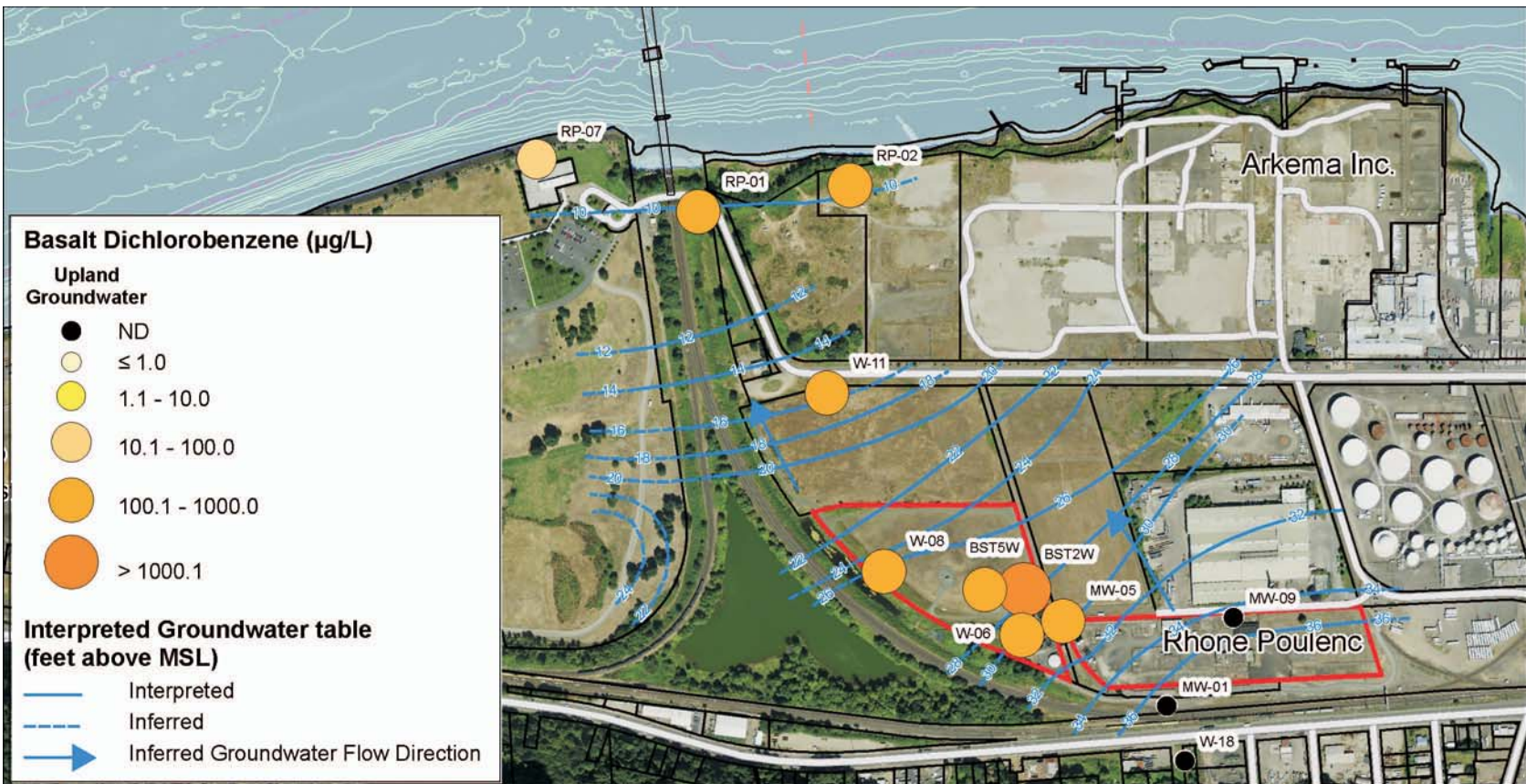
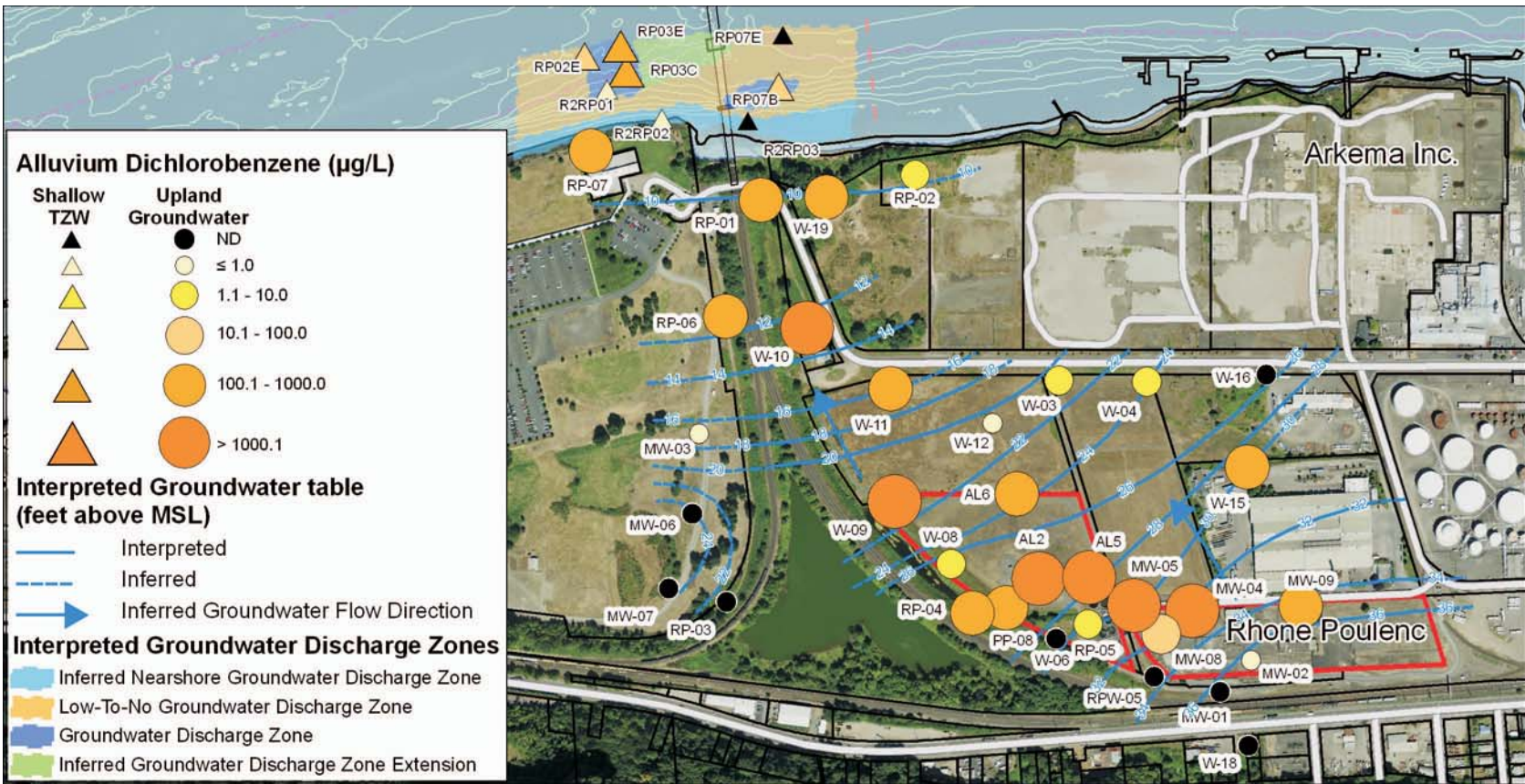
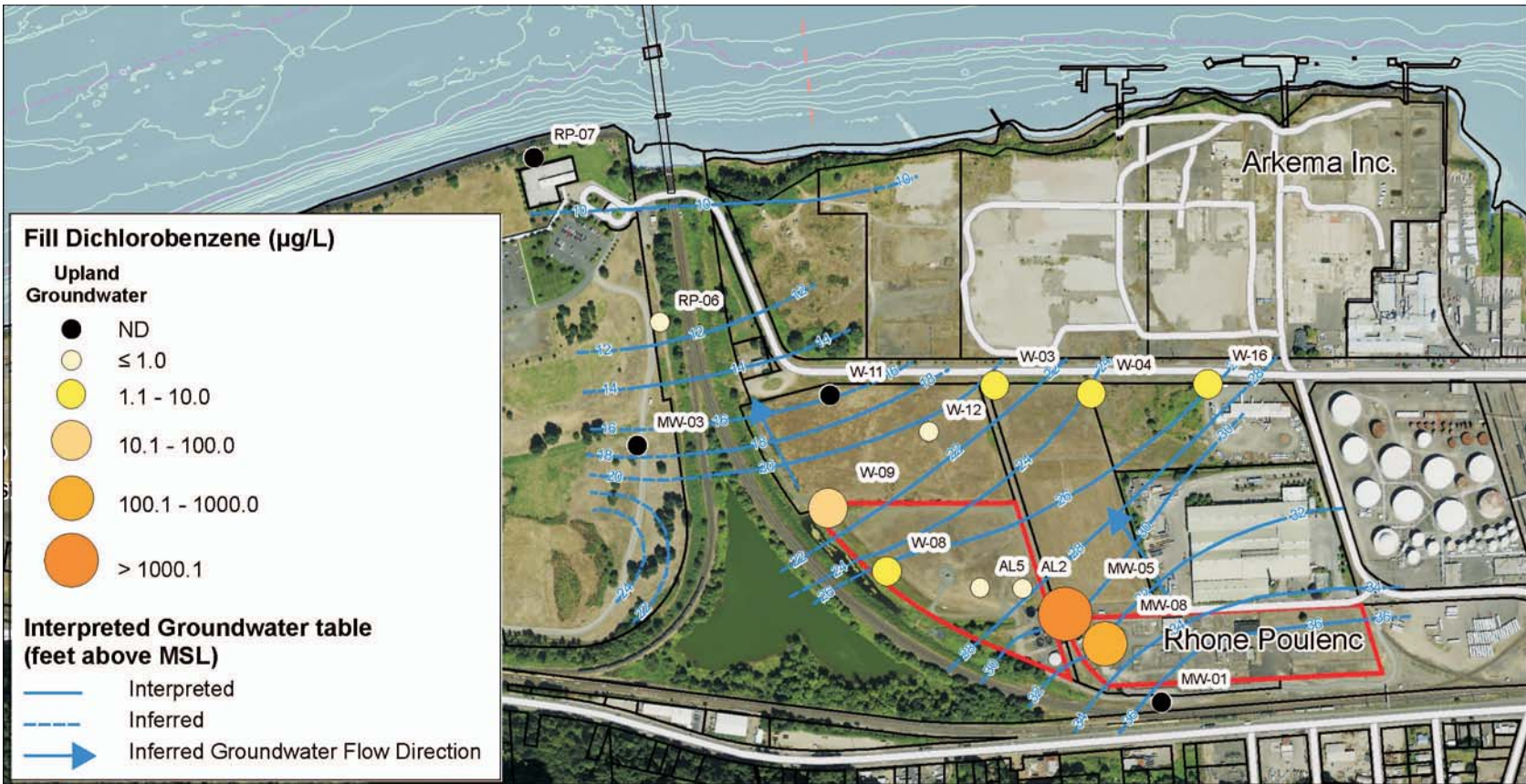
0 100 200

Feet

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Wells: Locations are approximate and drawn by measuring from Figure 2 (AMEC, July 2004).
Groundwater Contours: Locations are approximate and drawn by measuring from Figure 3-3 (AMEC, August 2002). Elevations are relative to the City of Portland Datum.



Figure 4.4-7a
Portland Harbor RI/FS
Remedial Investigation Report
Rhone Poulenc Site
Distribution of NAPL in Upland Groundwater

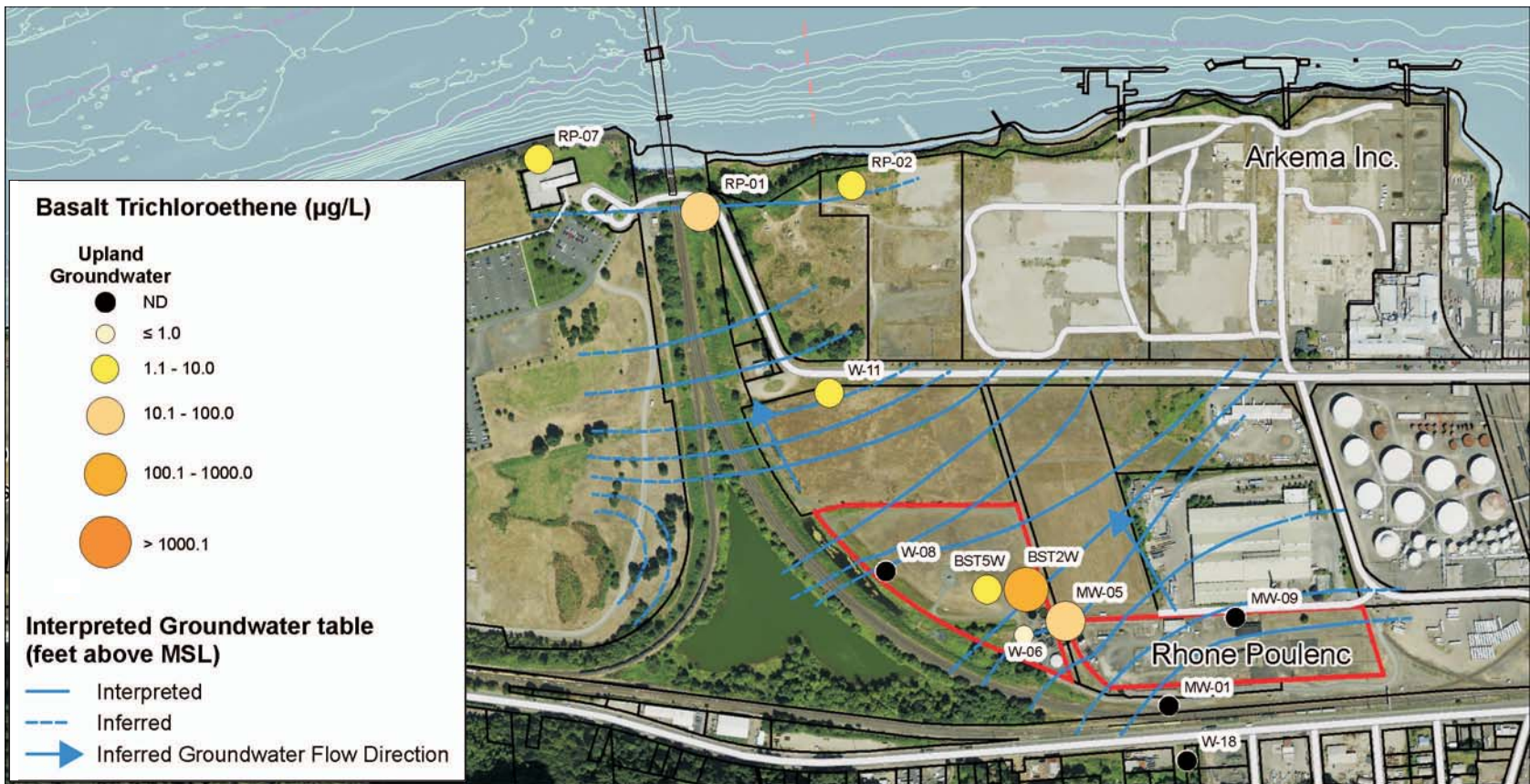
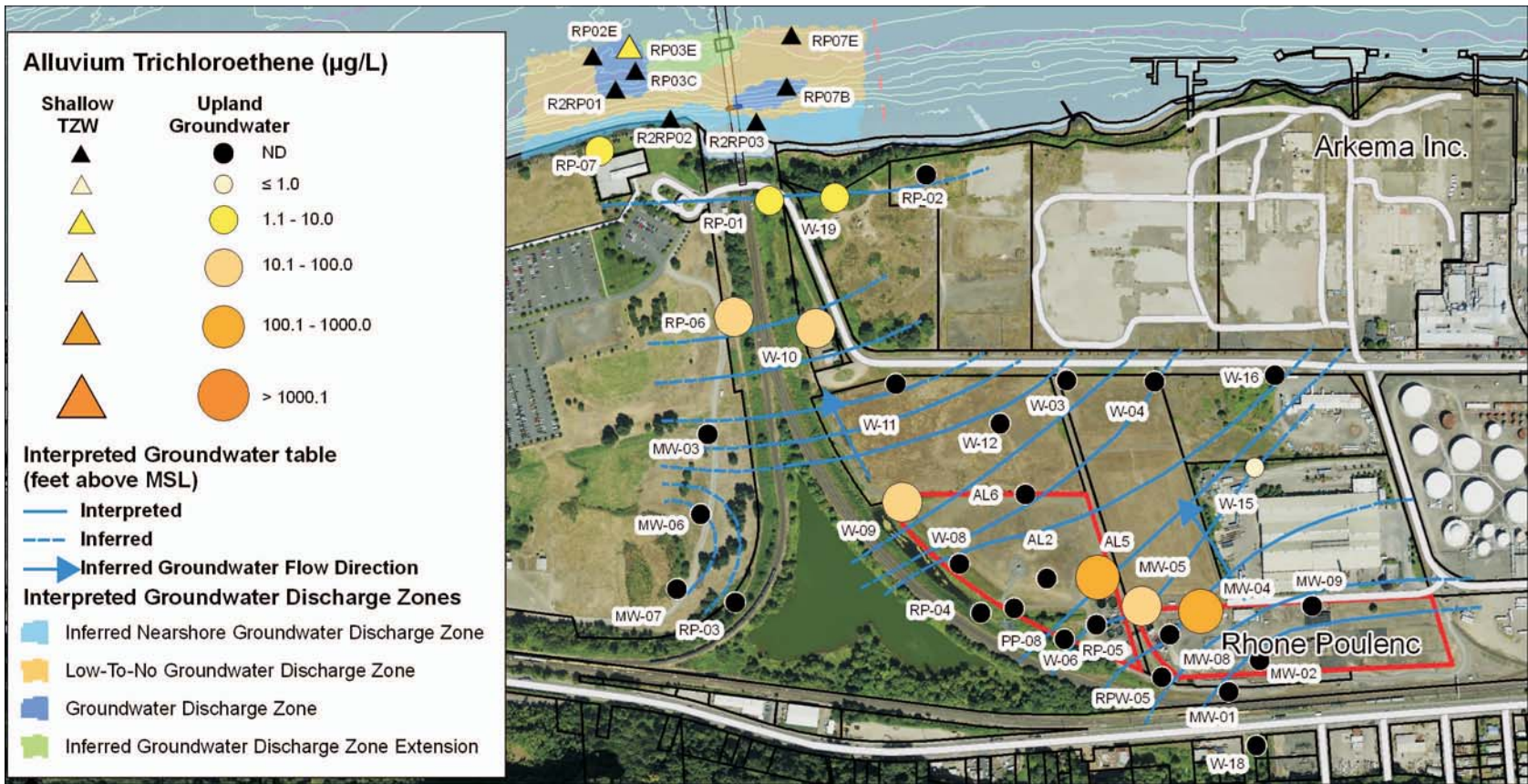
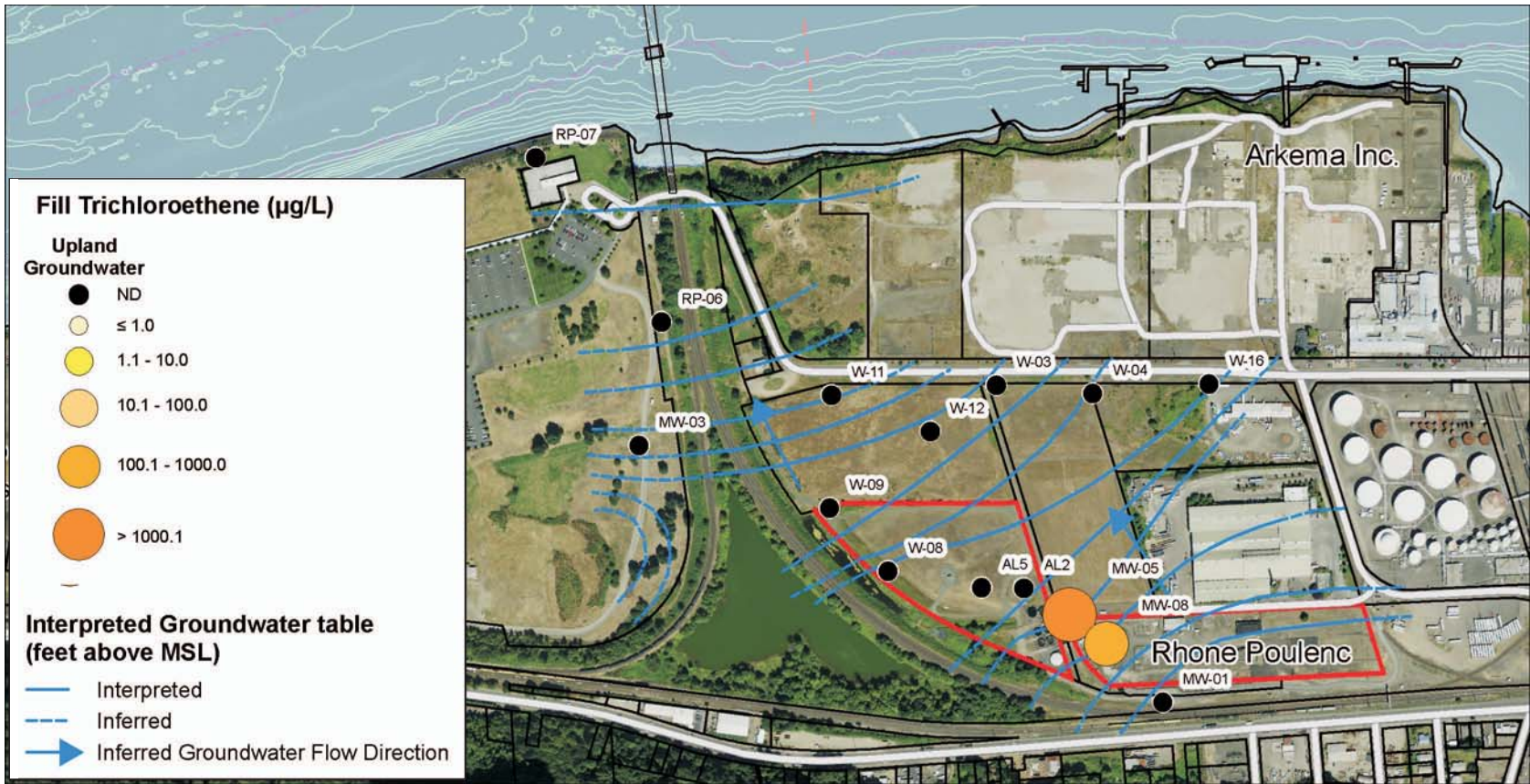


FEATURE SOURCES:
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Channel and River Miles: Developed from US Army Corps of Engineers information.
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Groundwater Contours: locations are approximate and drawn by measuring from Figure 3-3 (AMEC, August 2002), Elevations are relative to the City of Portland Datum.

LEGEND
— River Miles
— 2003 Bathymetric 5 Ft. Contours (NAVD88)
■ Site Property Boundary

0 150 300 Feet
[Scale bar]

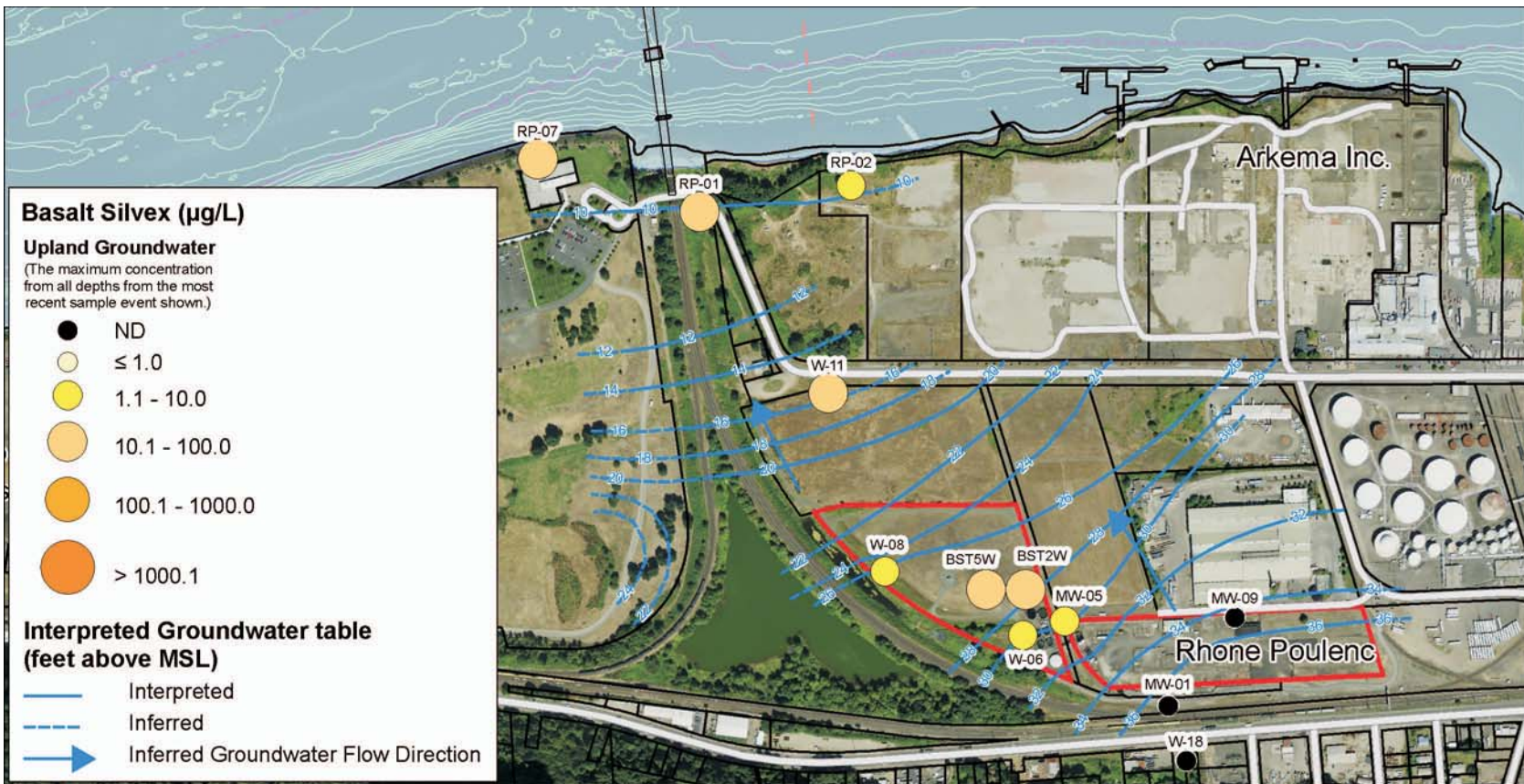
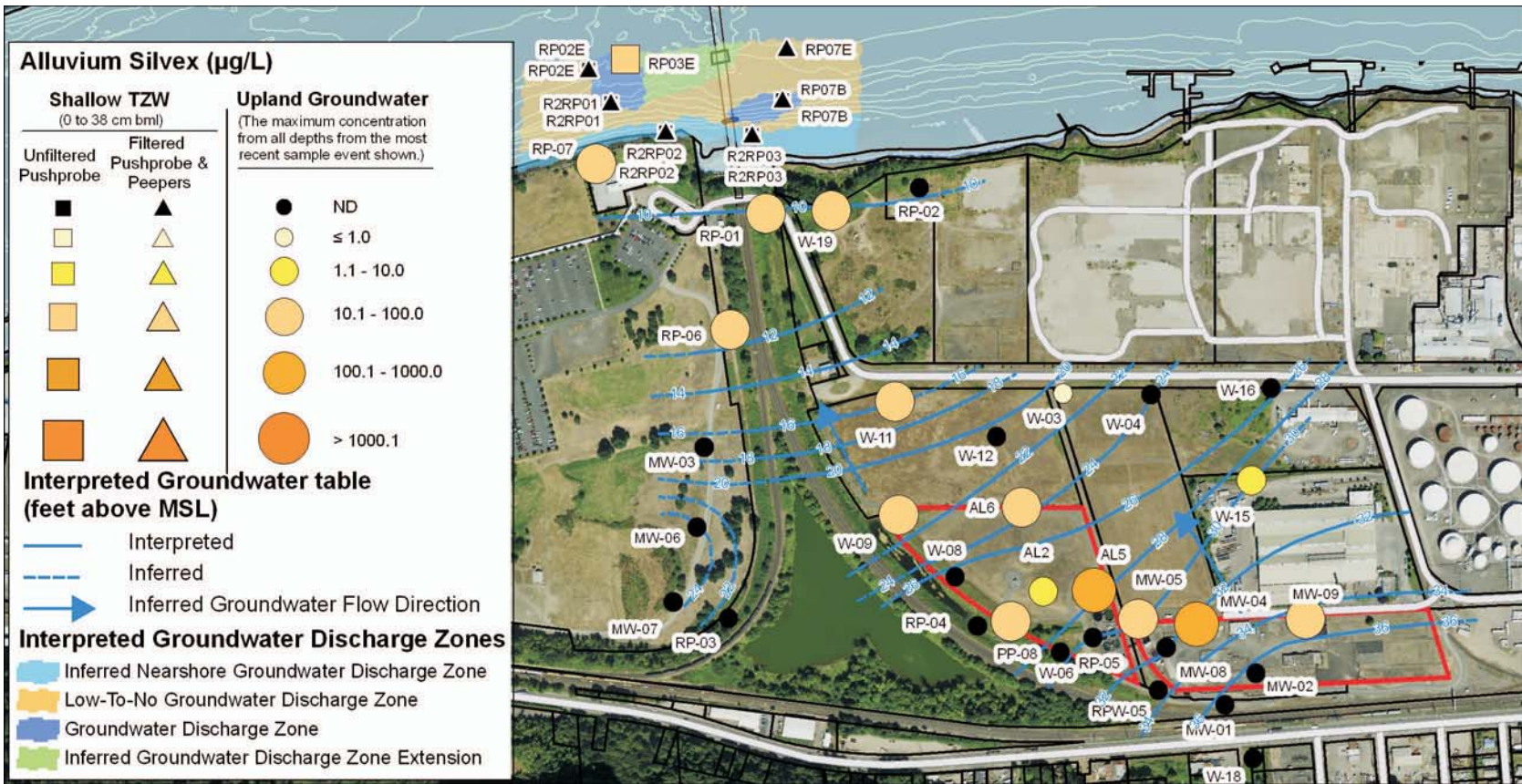
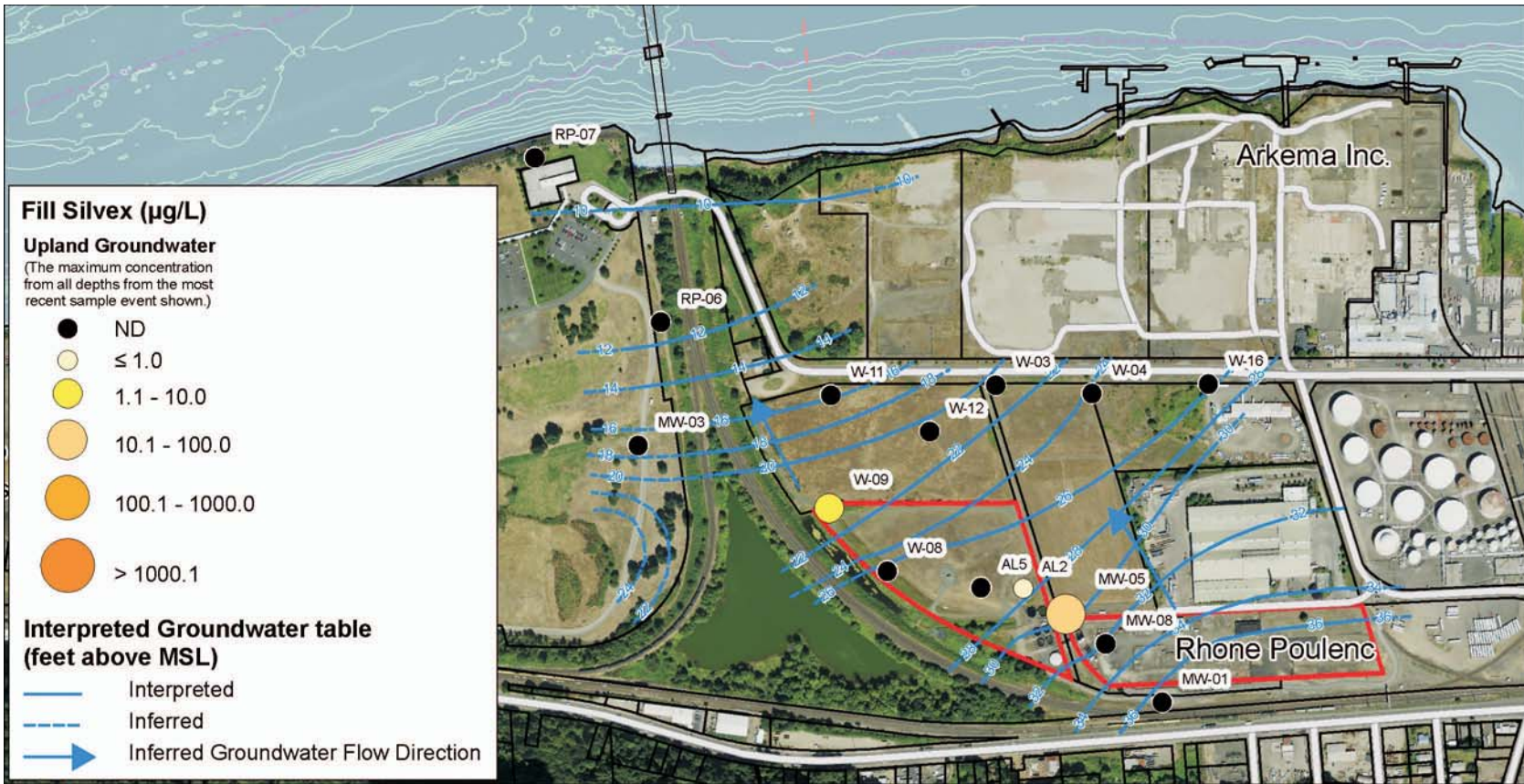
Figure 4.4-7b
Portland Harbor RI/FS
Remedial Investigation Report
Rhone Poulenc Site
1,2-Dichlorobenzene in Upland Groundwater
and Shallow TZW



FEATURE SOURCES:
 Aerial Photo: Metro RLIS, 2007.
 Base Map features from Portland Metro's RLIS.
 Channel and River Miles: Developed from US Army Corps of Engineers information.
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
 Wells: locations are approximate and drawn by measuring from Figure 2 (AMEC, July 2004)
 Groundwater Contours: locations are approximate and drawn by measuring from Figure 3-3 (AMEC, August 2002). Elevations are relative to the City of Portland Datum.

LEGEND
 River Miles
 2003 Bathymetric 5 Ft. Contours (NAVD88)
 Site Property Boundary
 0 150 300 Feet

Figure 4.4-7c
 Portland Harbor RI/FS
 Remedial Investigation Report
 Rhone Poulenc Site
 Trichloroethene in Upland Groundwater
 and Shallow TZW



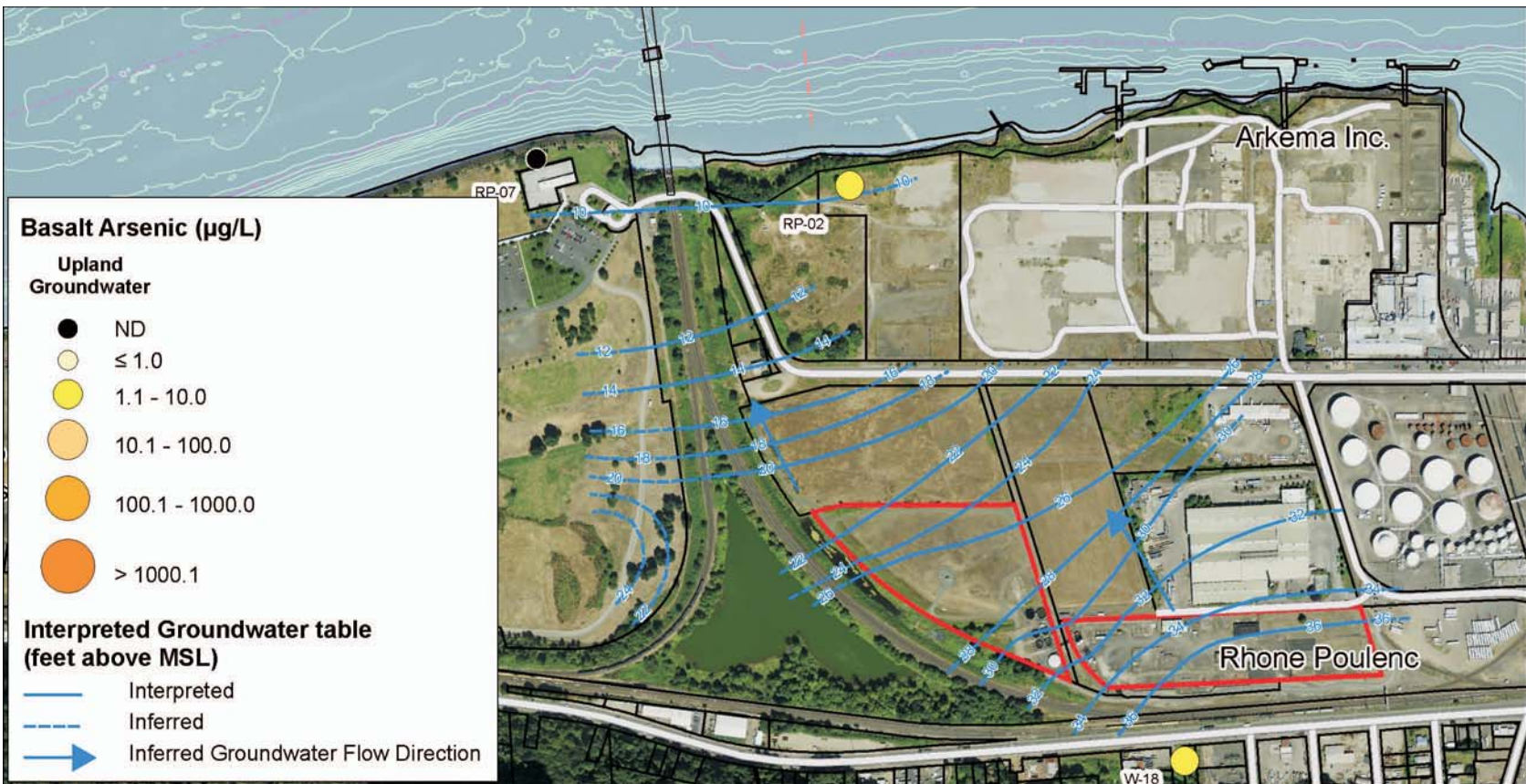
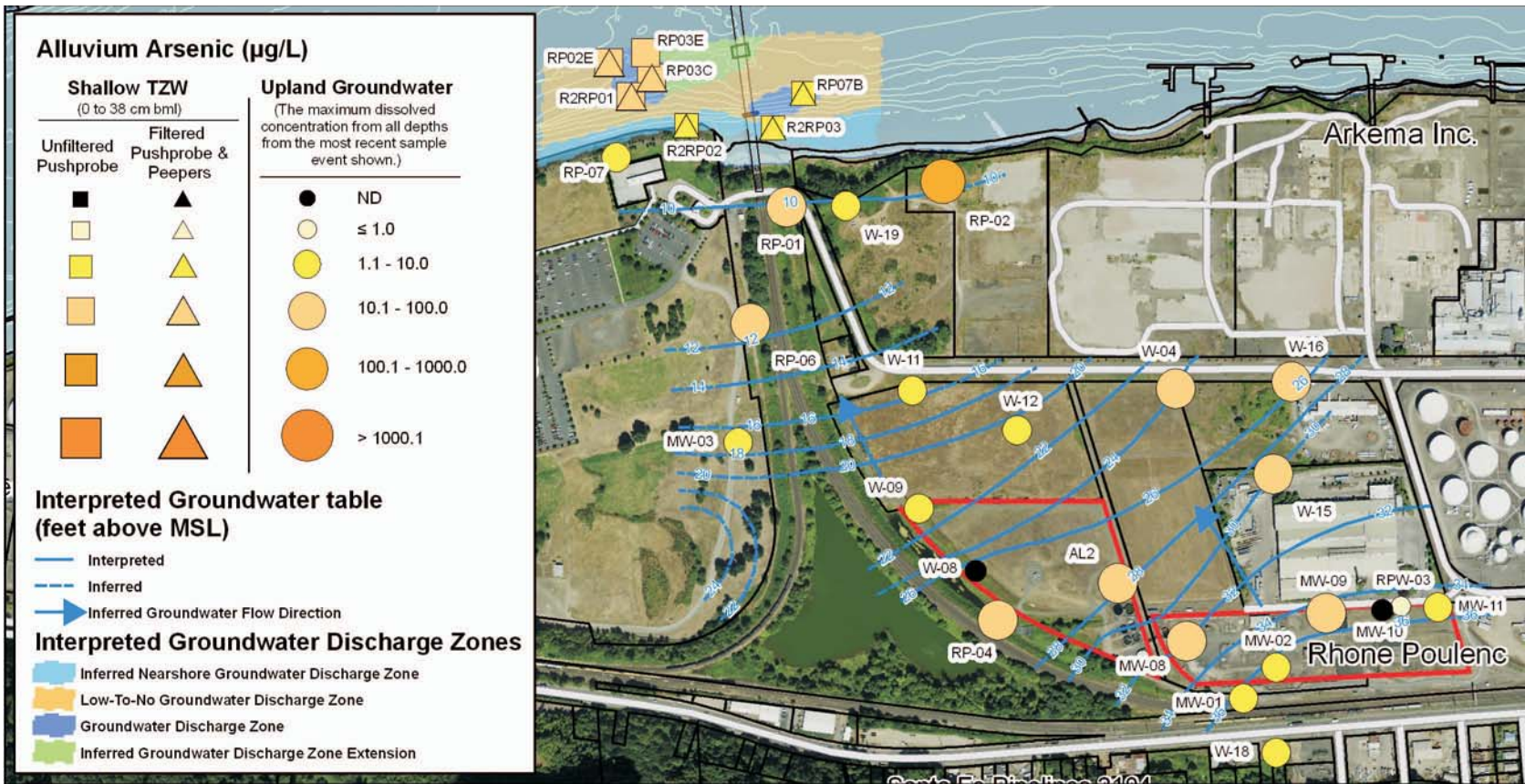
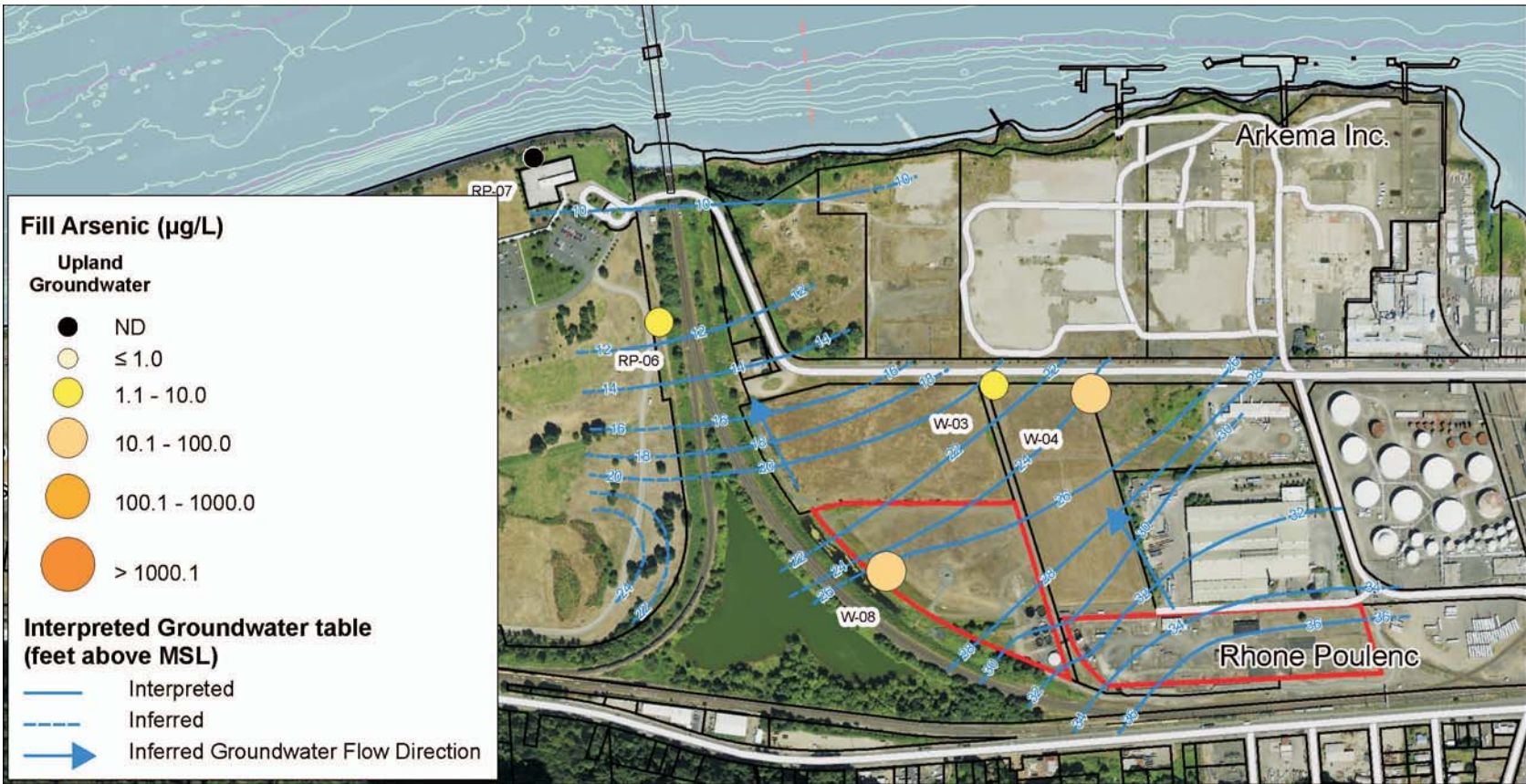
FEATURE SOURCES:
Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Wells: locations are approximate and drawn by measuring from Figure 2 (AMEC, July 2004)
Groundwater Contours: locations are approximate and drawn by measuring from Figure 3-3 (AMEC, August 2002). Elevations are relative to the City of Portland Datum.

LEGEND

- River Miles
- 2003 Bathymetric 5 Ft. Contours (NAVD88)
- Site Property Boundary

0 150 300 Feet

Figure 4.4-7d
Portland Harbor RI/FS
Remedial Investigation Report
Rhone Poulenc Site
Silvex in Upland Groundwater
and Shallow TZW



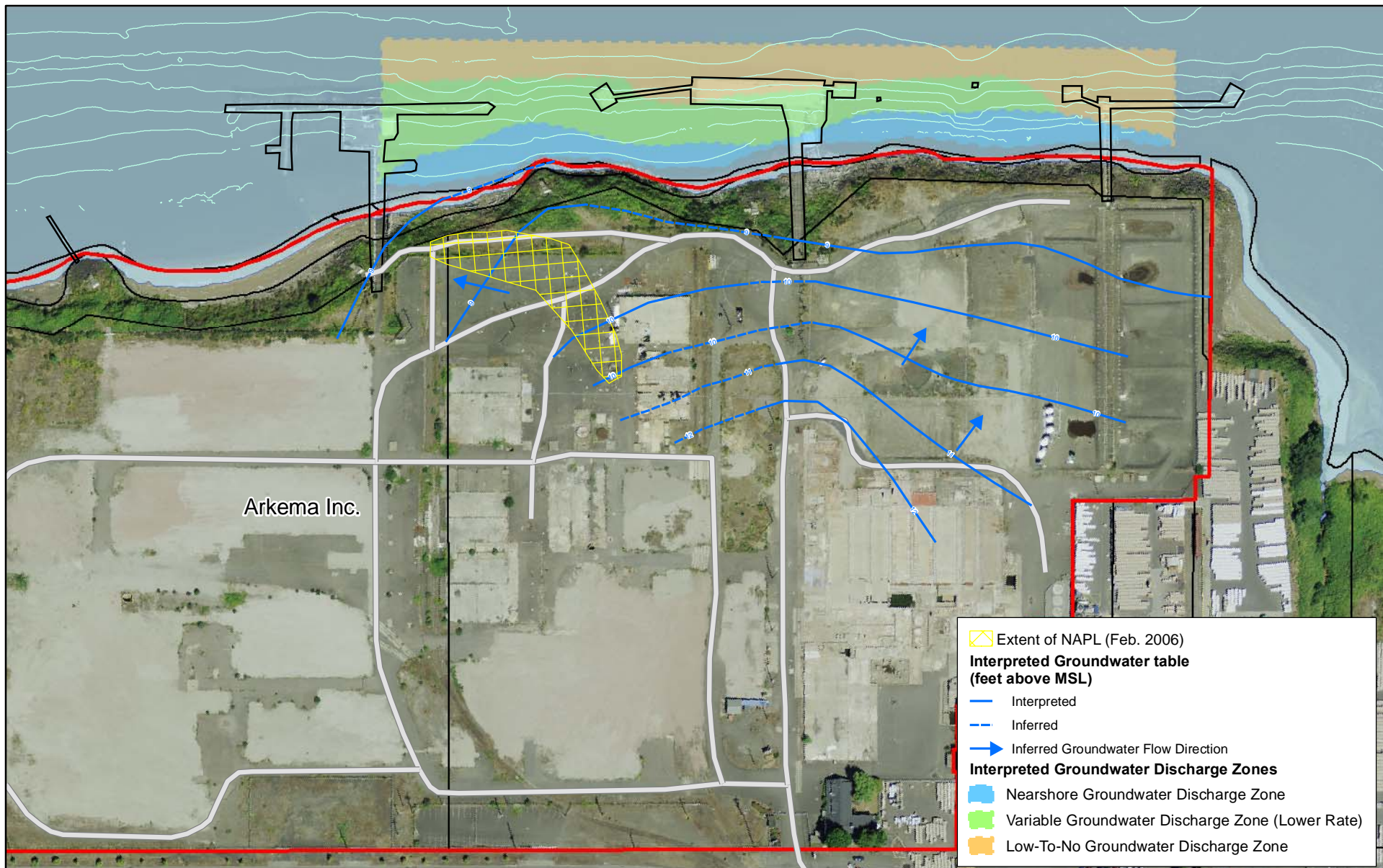
FEATURE SOURCES:
Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Wells: locations are approximate and drawn by measuring from Figure 2 (AMEC, July 2004)
Groundwater Contours: locations are approximate and drawn by measuring from Figure 3-3 (AMEC, August 2002). Elevations are relative to the City of Portland Datum.

LEGEND

- River Miles
- 2003 Bathymetric 5 Ft. Contours (NAVD88)
- Site Property Boundary

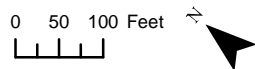
0 150 300 Feet

Figure 4.4-7Y
Portland Harbor RI/FS
Remedial Investigation Report
Rhone Poulenc Site
Arsenic in Upland Groundwater
and Shallow TZW



LEGEND

- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary



FEATURE SOURCES:
 Aerial Photo: Metro RLIS, 2007.
 Base Map features from Portland Metro's RLIS.
 Channel and River Miles: Developed from US Army Corps of Engineers information.
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
 Groundwater Contours: locations are approximate and drawn from ERM. 2004a.
 Upland Remedial Investigation Report, Lots 3 & 4 and Tract A, ATOFINA Chemicals Facility, Portland, OR. Prepared for ATOFINA Chemicals, Inc., Portland, OR. ERM-West, Inc., Bellevue, WA.



- ▨ Extent of NAPL (Feb. 2006)
- Interpreted Groundwater table (feet above MSL)**
 - Interpreted
 - - - Inferred
 - ➔ Inferred Groundwater Flow Direction
- Interpreted Groundwater Discharge Zones**
 - Nearshore Groundwater Discharge Zone
 - Variable Groundwater Discharge Zone (Lower Rate)
 - Low-To-No Groundwater Discharge Zone

Figure 4.4-8a
 Portland Harbor RI/FS
 Remedial Investigation Report
 Arkema Site
 Distribution of NAPL in Upland Groundwater

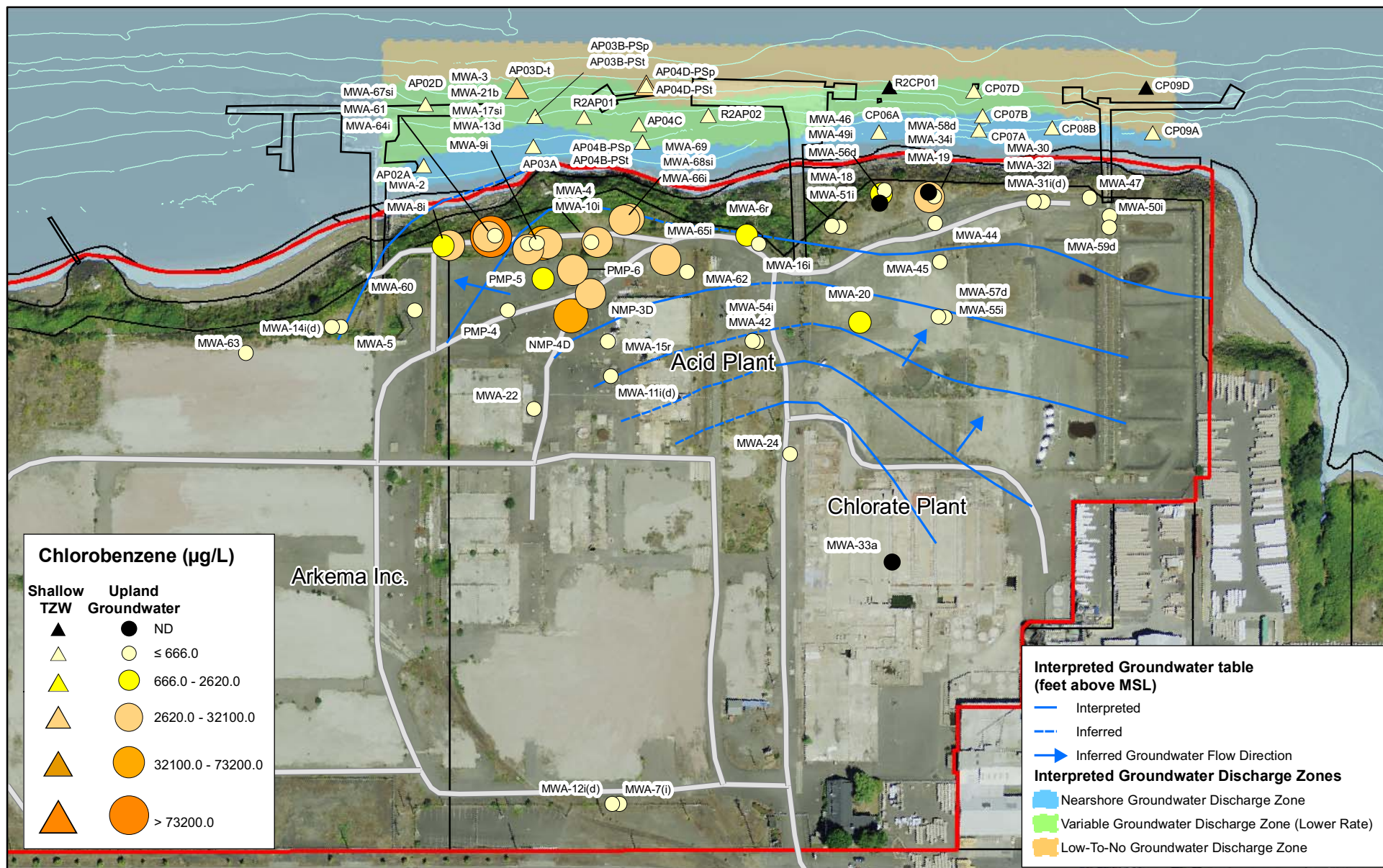
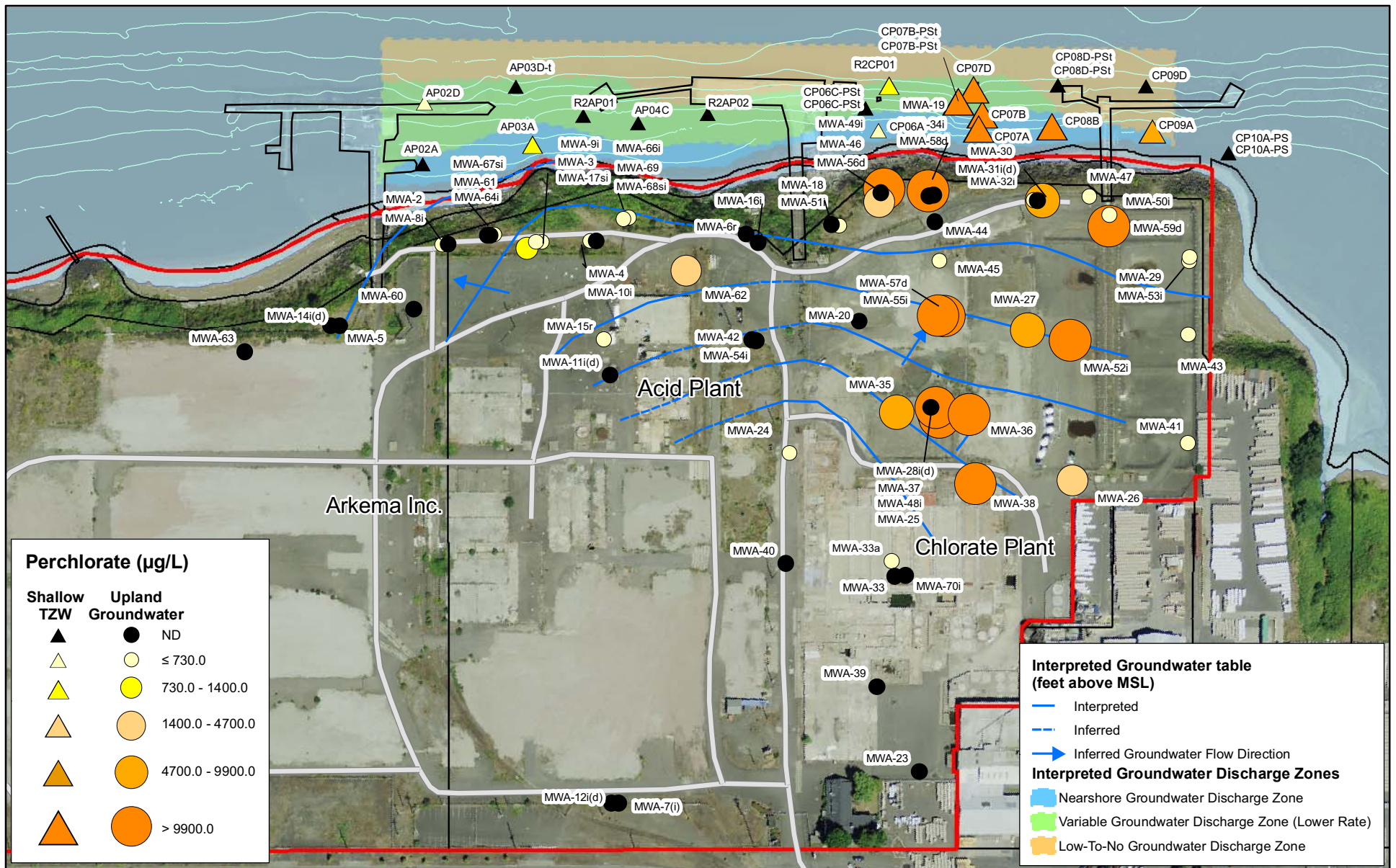


Figure 4.4-8b
 Portland Harbor RI/FS
 Remedial Investigation Report
 Arkema Site
 Chlorobenzene in Upland Groundwater
 and Shallow TZW



LEGEND

2003 Bathymetric 5 Ft. Contours (NAVD 88)

Site Property Boundary

0 50 100
Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Groundwater elevation contours and flow directions adapted from ERM 2005.
Upland Remedial Investigation Report Lots 3 & 4 and Tract A - Revision 1, Arkema, Inc. Portland Facility. December 2005
Groundwater Wells: locations are approximate and are drawn from ERM 2004a.
Upland Remedial Investigation Report, Lots 3 & 4 and Tract A, ATOFINA Chemicals Facility, Portland, OR, and the Site-wide Groundwater Monitoring Report - April 2007 Monitoring Event, Arkema, Inc. Facility, Portland, Oregon, ERM, October 2007

Figure 4.4-8c
Portland Harbor RI/FS
Remedial Investigation Report
Arkema Site
Perchlorate in Upland Groundwater
and Shallow TZW

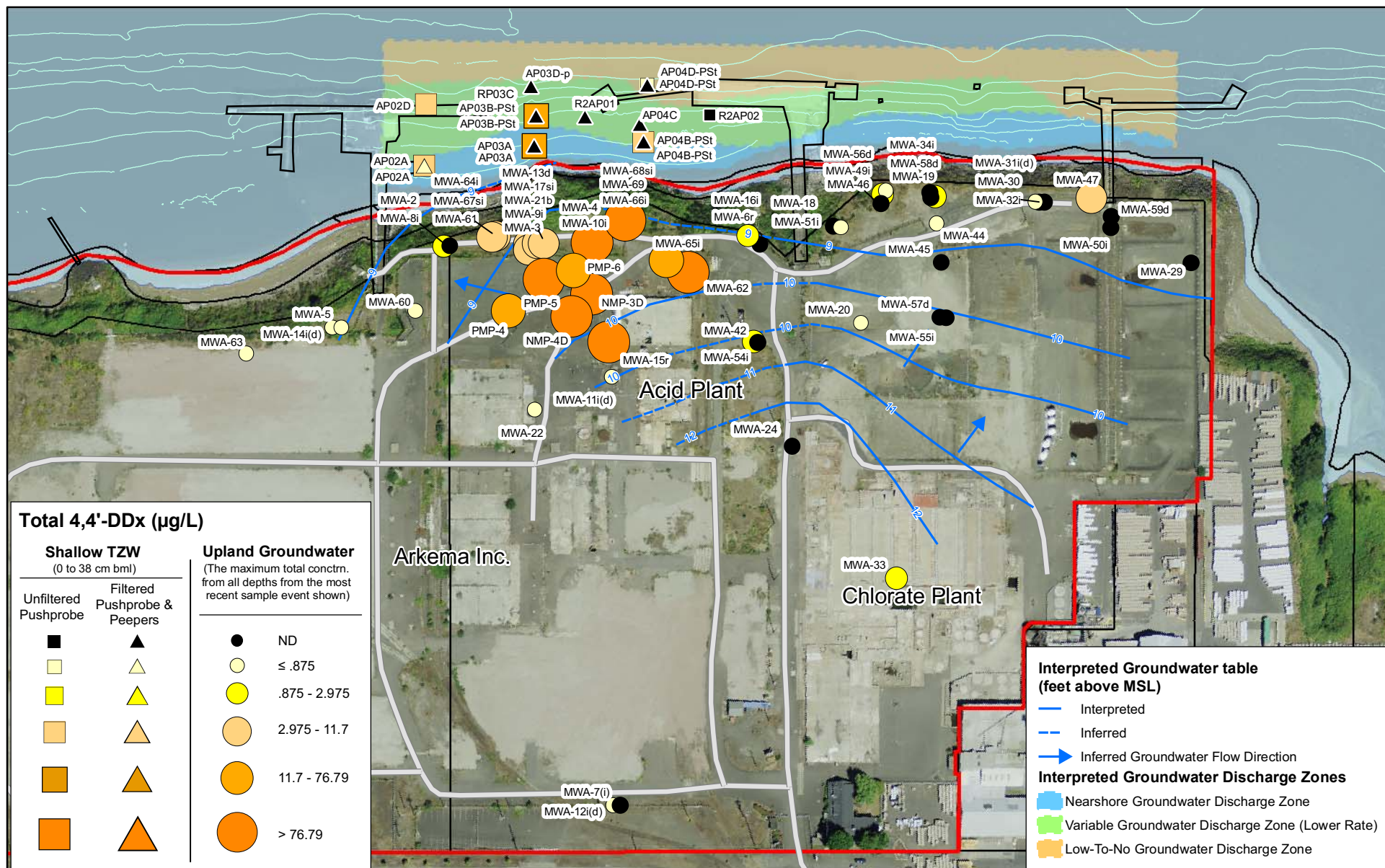


Figure 4.4-8d
 Portland Harbor RI/FS
 Remedial Investigation Report
 Arkema Site
 Total of 4,4'-DDx in Upland Groundwater
 and Shallow TZW

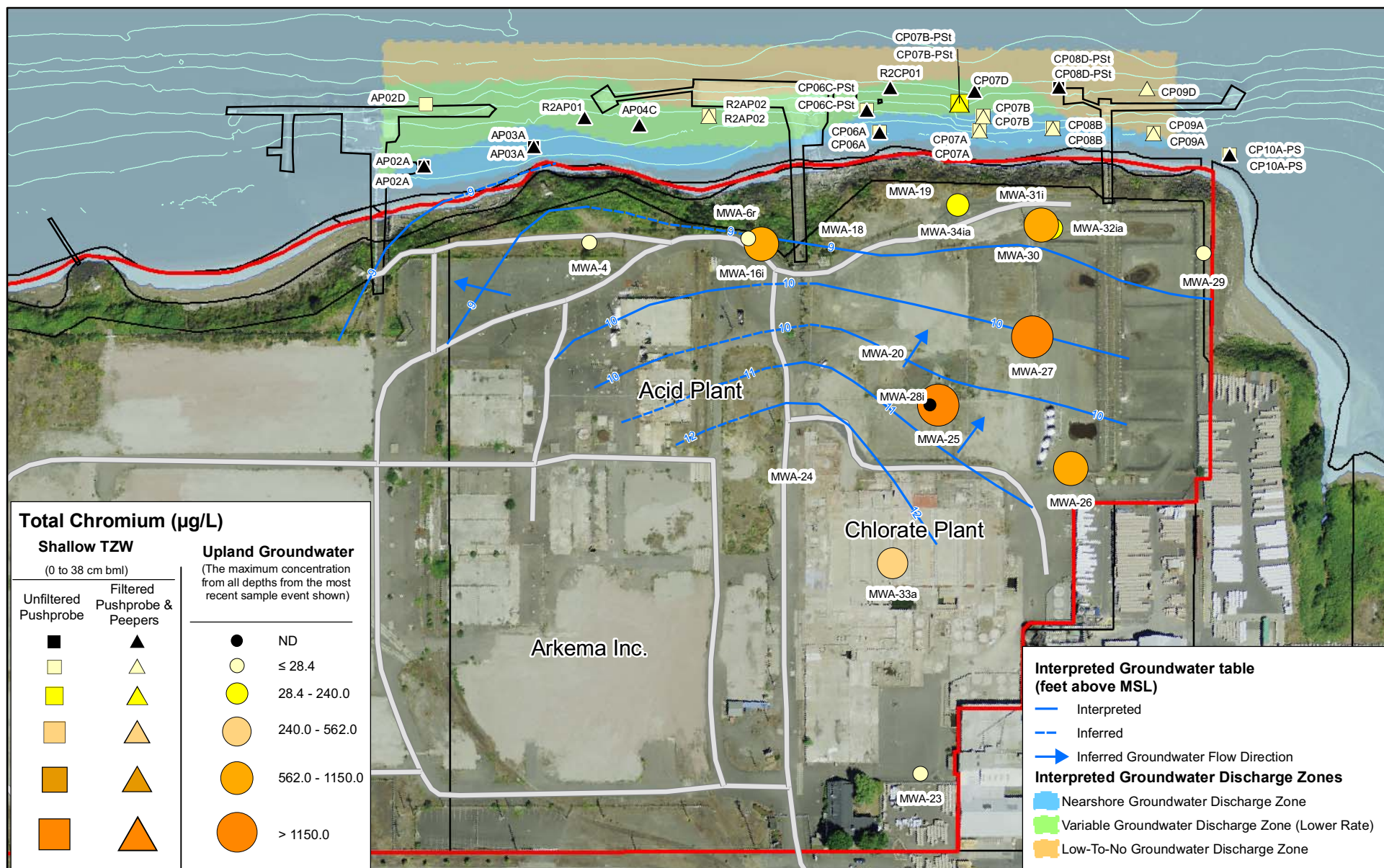
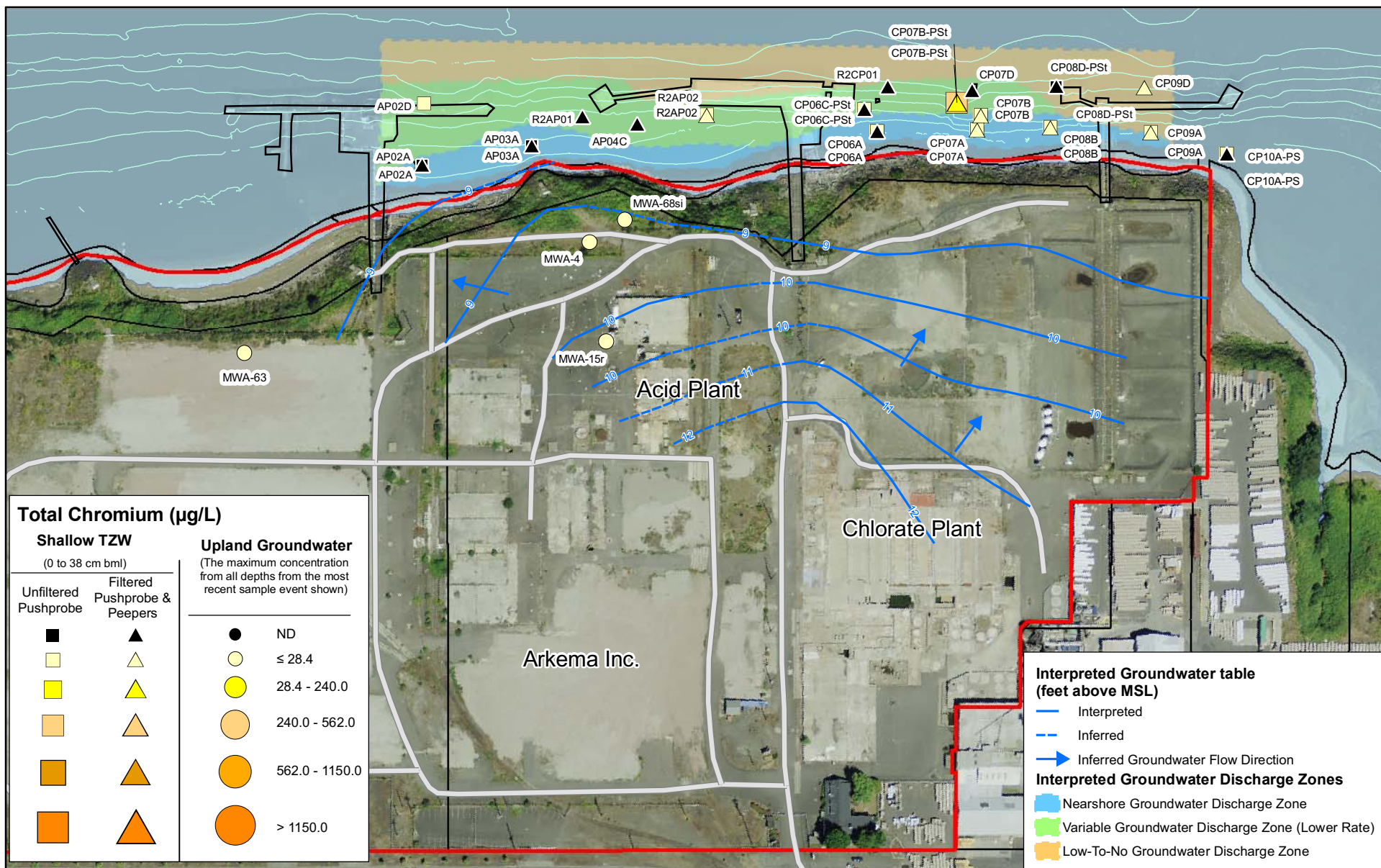


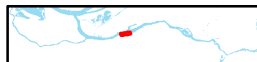
Figure 4.4-8e
 Portland Harbor RI/FS
 Remedial Investigation Report
 Arkema Site
 Total Chromium in Upland Groundwater
 and Shallow TZW (2003 Data)



LEGEND

- 2003 Bathymetric 5 Ft. Contours (NAVD 88)
- Site Property Boundary

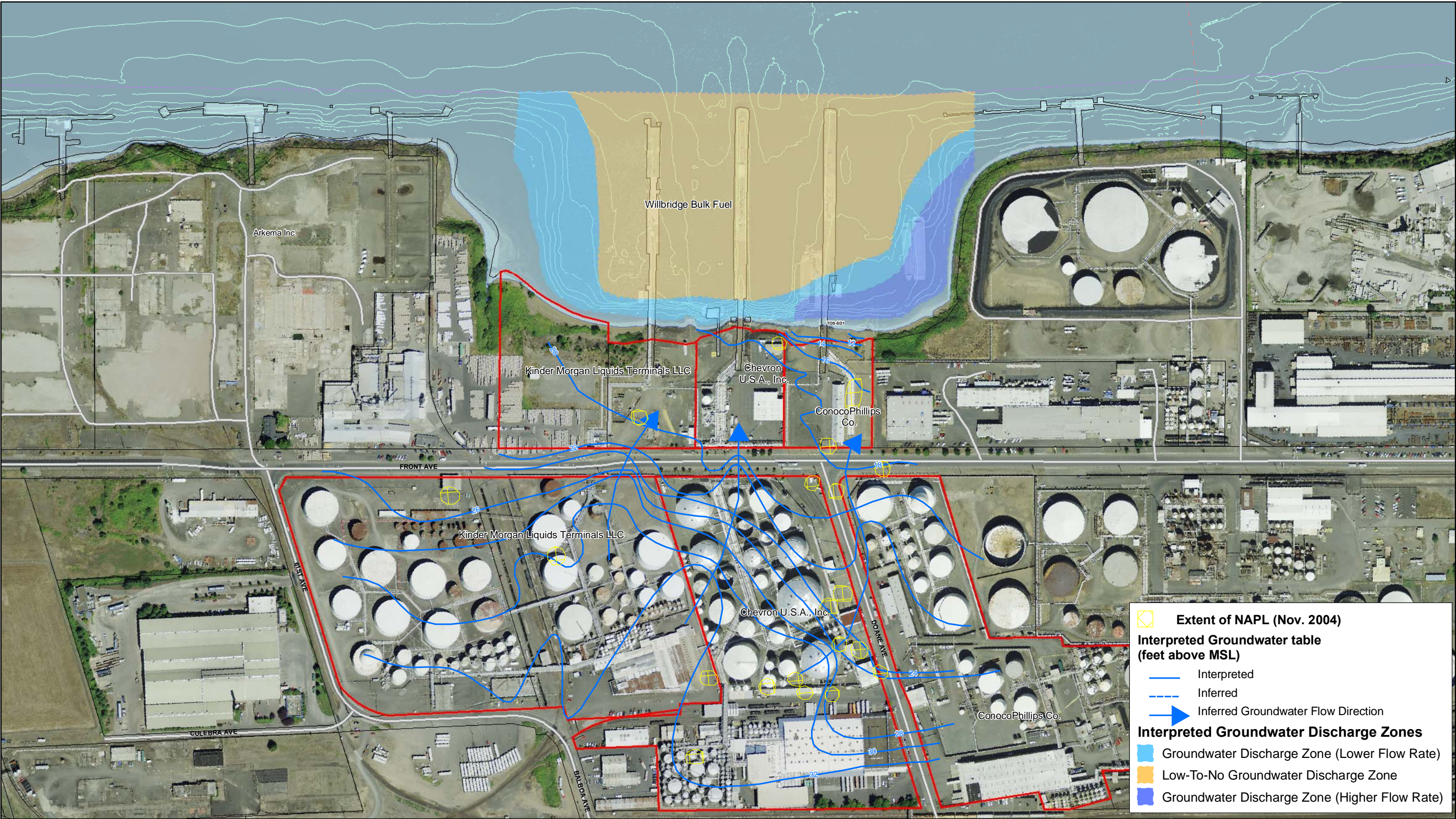
0 50 100
Feet



FEATURE SOURCES:

Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Groundwater elevation contours and flow directions adapted from ERM 2005.
Upland Remedial Investigation Report Lots 3 & 4 and Tract A - Revision 1, Arkema, Inc. Portland Facility. December 2005
Groundwater Wells: locations are approximate and are drawn from ERM 2004a.
Upland Remedial Investigation Report, Lots 3 & 4 and Tract A, ATOFINA Chemicals Facility, Portland, OR. and the Site-wide Groundwater Monitoring Report - April 2007 Monitoring Event, Arkema, Inc. Facility, Portland, Oregon, ERM, October 2007

Figure 4.4-8f
Portland Harbor RI/FS
Remedial Investigation Report
Arkema Site
Total Chromium in Upland Groundwater
and Shallow TZW (2006-2007 Data)



LEGEND

- River Miles
- 2003 Bathymetric 5 Ft. Contours (NAVD88)
- Navigation Channel
- Site Property Boundary

0 100 200
Feet

FEATURE SOURCES:
Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.



Figure 4.4-9a
Portland Harbor RI/FS
Remedial Investigation Report
Willbridge Site
Distribution of NAPL in Upland Groundwater

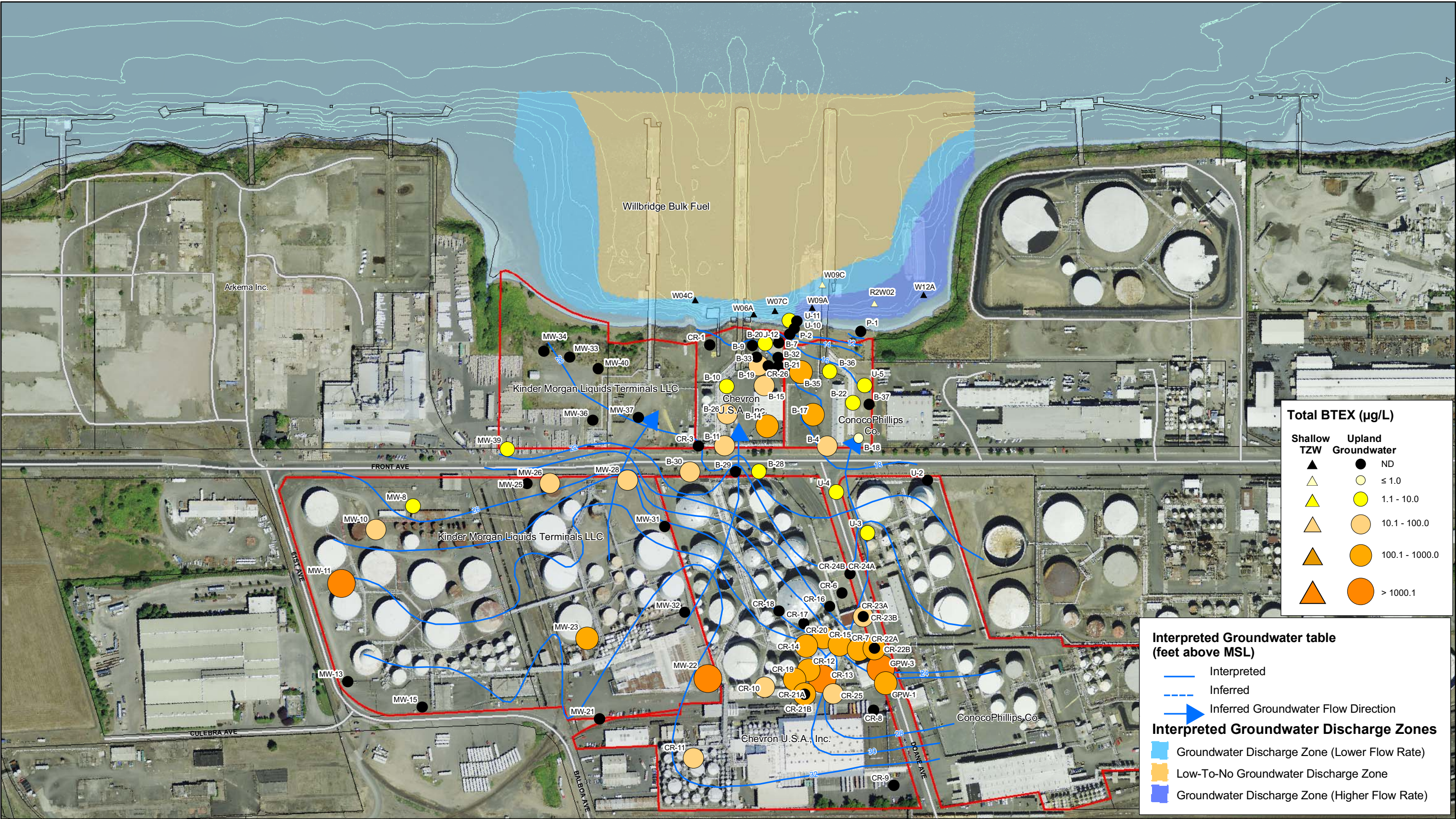


Figure 4.4-9b
Portland Harbor RI/FS
Remedial Investigation Report
Willbridge Site
Total BTEX in Upland Groundwater
and Shallow TZW

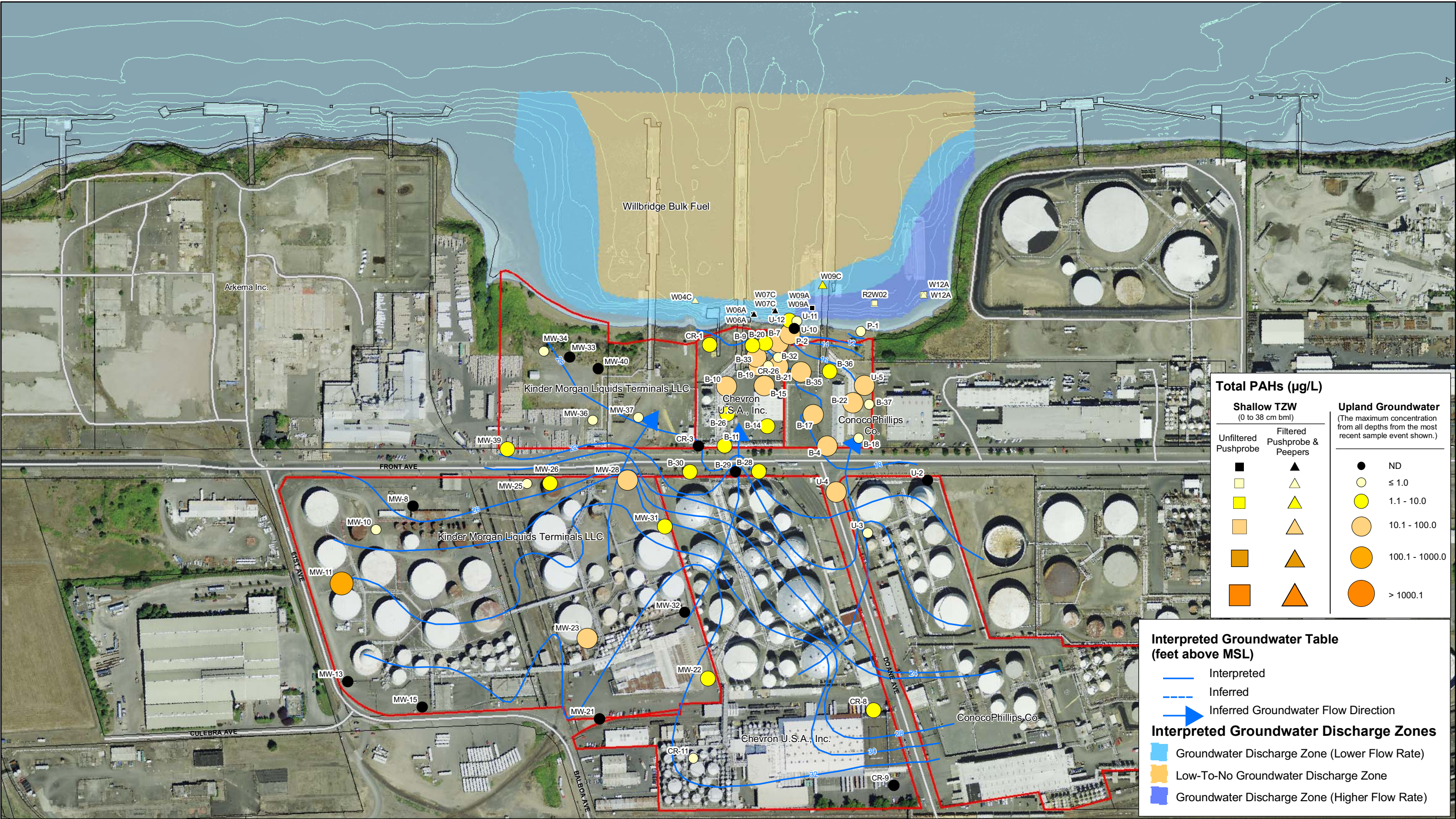
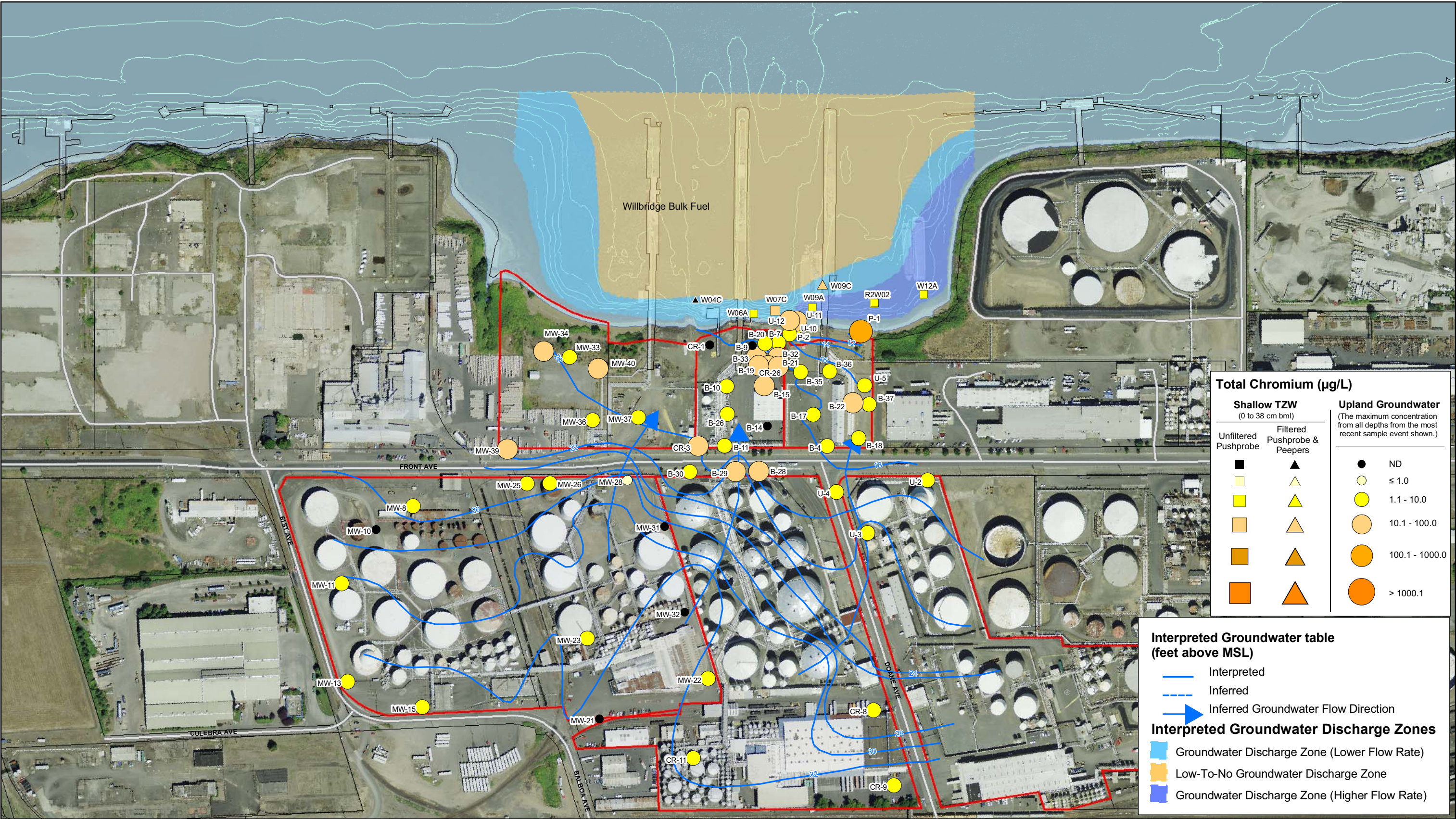


Figure 4.4-9c
Portland Harbor RI/FS
Remedial Investigation Report
Willbridge Site
Total PAHs in Upland Groundwater
and Shallow TZW



Total Chromium (µg/L)		
Shallow TZW (0 to 38 cm bml)		Upland Groundwater (The maximum concentration from all depths from the most recent sample event shown.)
Unfiltered Pushprobe	Filtered Pushprobe & Peepers	
■	▲	● ND
■	▲	● ≤ 1.0
■	▲	● 1.1 - 10.0
■	▲	● 10.1 - 100.0
■	▲	● 100.1 - 1000.0
■	▲	● > 1000.1

- Interpreted Groundwater table (feet above MSL)**
- Interpreted
 - - - Inferred
 - ➡ Inferred Groundwater Flow Direction
- Interpreted Groundwater Discharge Zones**
- Groundwater Discharge Zone (Lower Flow Rate)
 - Low-To-No Groundwater Discharge Zone
 - Groundwater Discharge Zone (Higher Flow Rate)

LEGEND

— 2003 Bathymetric 5 Ft. Contours (NAVD88)

■ Site Property Boundary

0 100 200
Feet

▲

FEATURE SOURCES:
Aerial Photo: Metro RLIS, 2007.
Base Map features from Portland Metro's RLIS.
Channel and River Miles: Developed from US Army Corps of Engineers information.
Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos.
Wells: locations are approximate and drawn from Delta Environmental Consultants 2005. Semi Annual Groundwater Monitoring Report (April 2004 through September 2004, Willbridge Bulk Fuel Terminals, March 15, 2005).



Figure 4.4-9d
Portland Harbor RI/FS
Remedial Investigation Report
Willbridge Site
Total Chromium in Upland Groundwater
and Shallow TZW

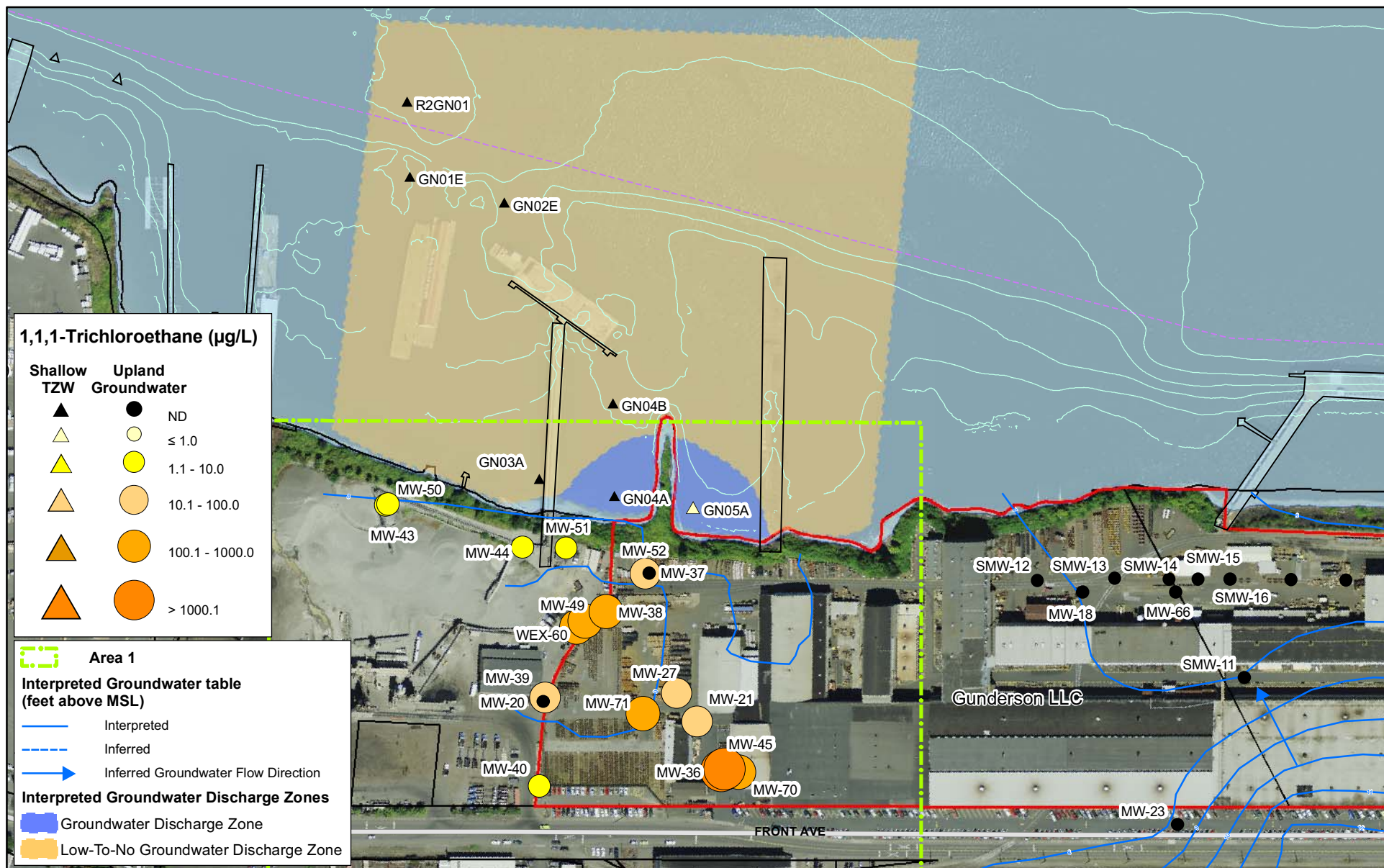


Figure 4.4-10a
 Portland Harbor RI/FS
 Remedial Investigation Report
 Gunderson Site
 1,1,1-Trichloroethane in
 Upland Groundwater and Shallow TZW

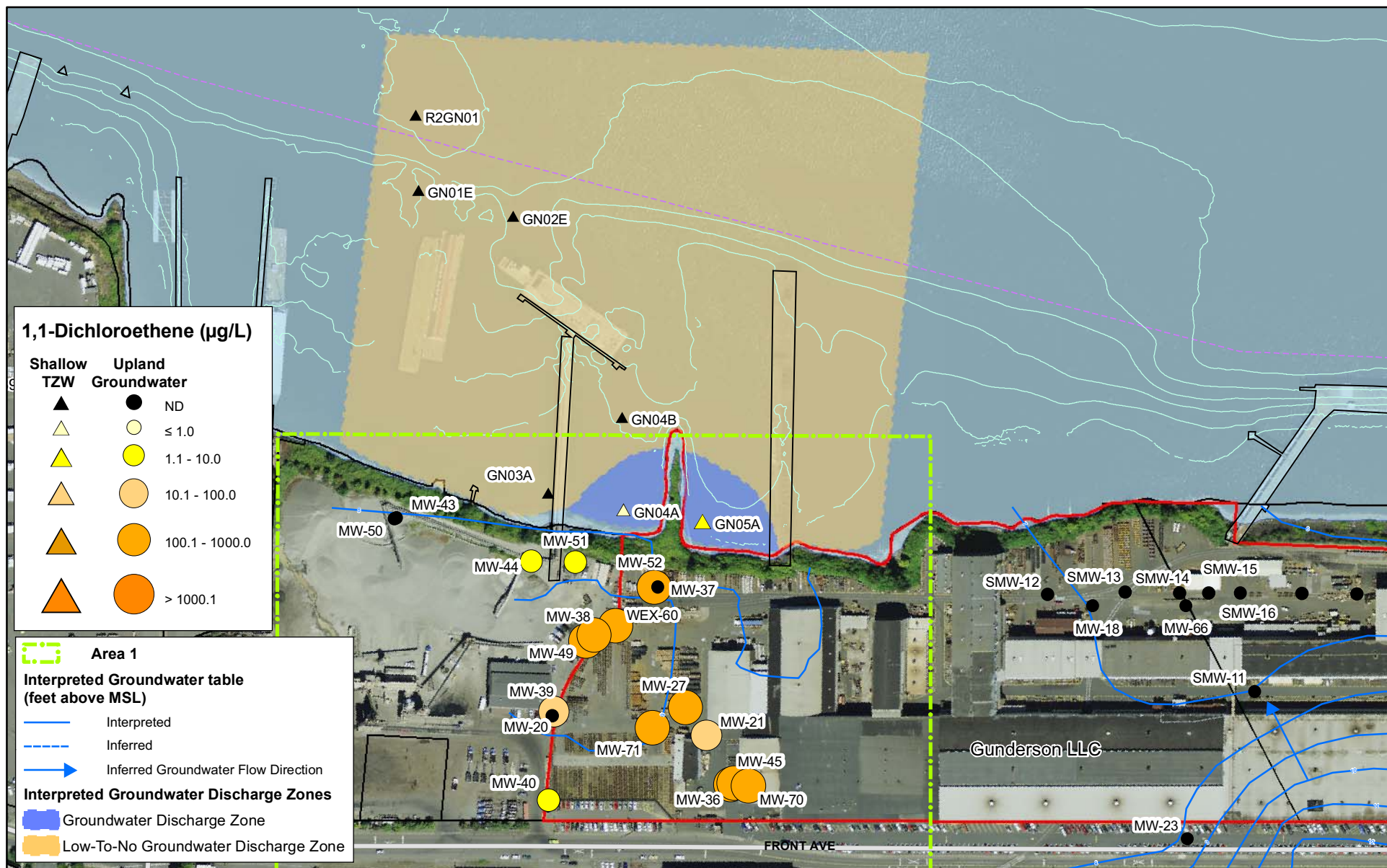


Figure 4.4-10b
 Portland Harbor RI/FS
 Remedial Investigation Report
 Gunderson Site
 1,1-Dichloroethene in
 Upland Groundwater and Shallow TZW

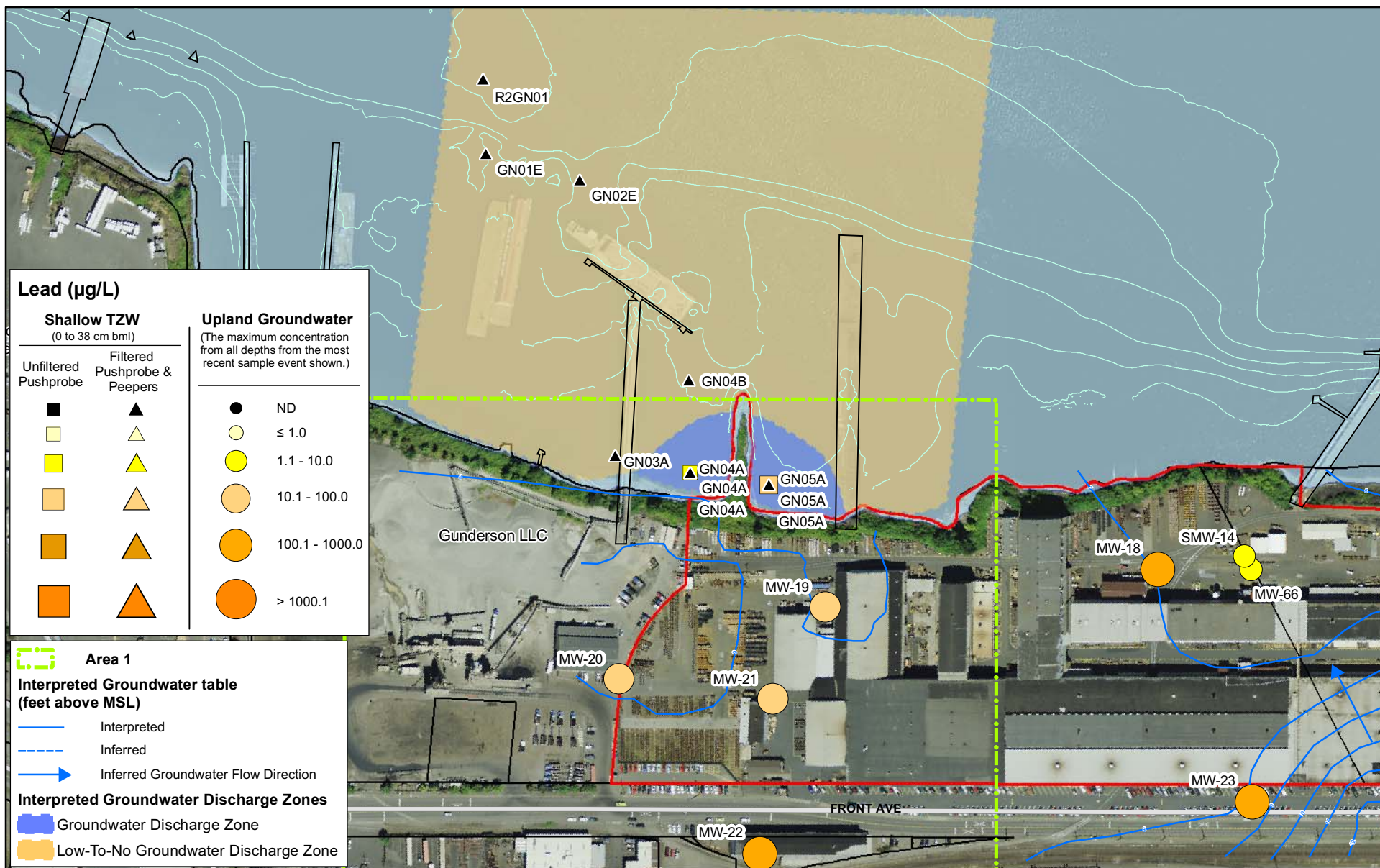


Figure 4.4-10c
Portland Harbor RI/FS
Remedial Investigation Report
Gunderson Site
Total Lead in Upland Groundwater
and Shallow TZW